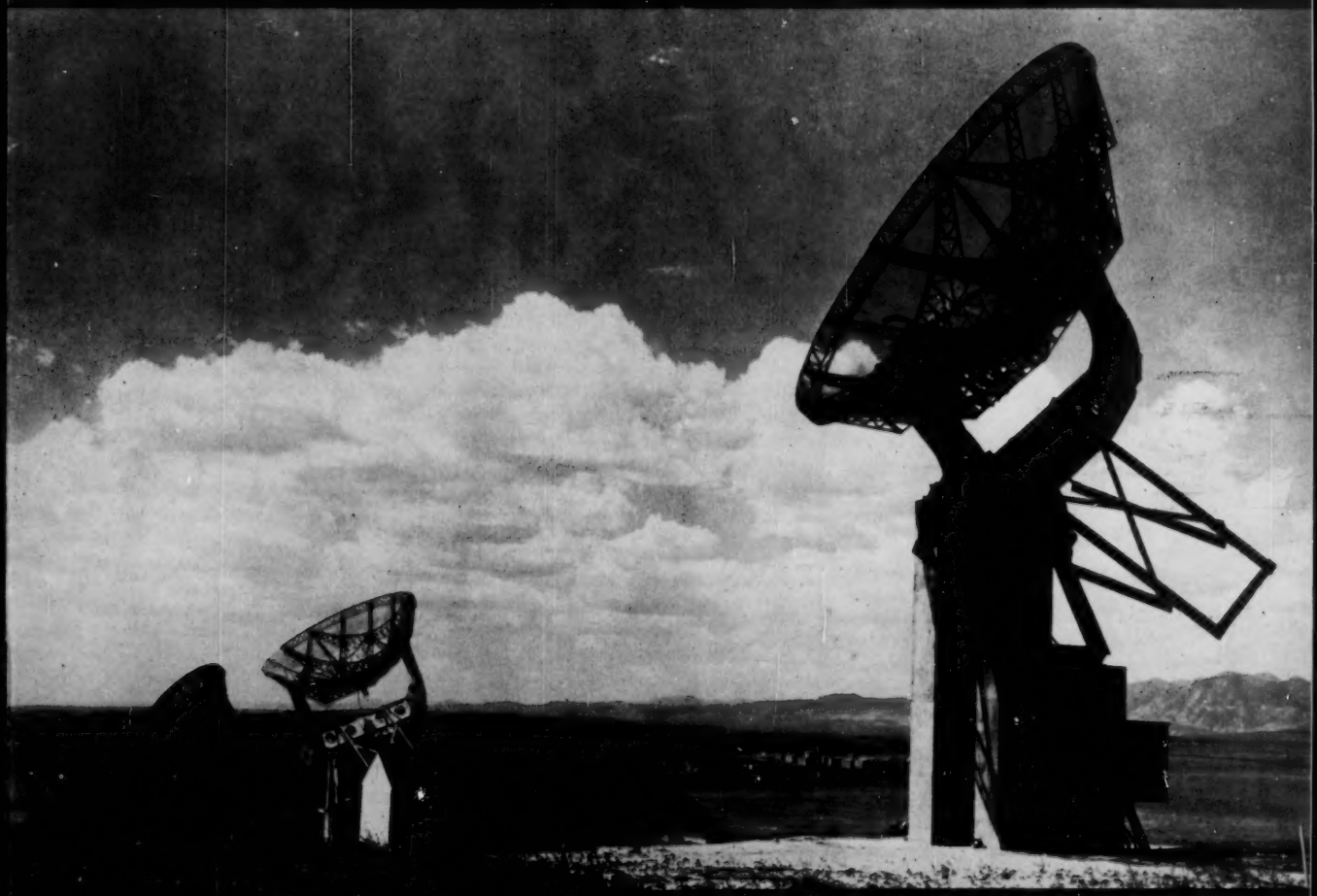
THE MAGAZINE OF

Standards



. . . precise measurement and the race for technological supremacy . . . Page 37

FEBRUARY 1958

In Two Parts — Part 1

THE MAGAZINE OF

Standards

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ASA

Our Cover

Gun Barrel Hill, Colorado, National Bureau of Standards' Central Radio Propagation Laboratory field station, features three giant radio telescopes. These are arranged to receive radio waves from the sun and automatically to track the sun as it moves across the sky. Each antenna is tuned to receive a different frequency from the many emitted by the sun. Radio astronomy aids in the study of radio waves coming from outer space and their effect upon radio communication. (See article about NBS, page 37.)

ASA

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Opinions expressed by authors in THE MAGAZINE OF STANDARDS *are not necessarily those of the American Standards Association.*

In Two Parts—Part 1

FEATURES

Precise Measurement and the Race for Technological Supremacy. *By A. V. Astin*. 37
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Technical Committee 4 on Hydraulic Turbines of the International Electrotechnical Commission is working on an International Code for turbines. Its special subcommittee reported on a study of the thermodynamic method for determining the efficiency of hydraulic turbines.

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Veltfort and Massey Head Standards Council 47
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• **Your index** to the January-December, 1957, issues of THE MAGAZINE OF STANDARDS, Volume 28, is enclosed. Bound separately, and issued as Part 2, the index will be easy for you to bind with copies of the magazine for your permanent records.

As a help in keeping your current, 1958, magazines handy, you may order loose-leaf binders from the American Standards Association at $2.50 each. They show the name, THE MAGAZINE OF STANDARDS, and this year's date, 1958.

And speaking of indexes, a draft standard is now being completed that should be a real help to all who are faced with the problem of making an index. The draft was prepared by a subcommittee of the Sectional Committee on Documentation, Z39. Mrs Anne Richter of R. R. Bowker Publishing Company is subcommittee chairman. She had a high-power committee representing such outstanding authorities as the Library of Congress, H. W. Wilson Company, the Encyclopedia Britannica, and the Encyclopedia Americana working with her. The draft will be considered at an April meeting.

• **So much talk** is heard concerning the need for research and scientific development since launching of the Sputniks that it seems important to consider whether standards play any part in the fascinating drama for the conquest of space. Dr A. V. Astin, chief of the National Bureau of Standards, believes they do, and appeals strongly for greater support for fundamental standards work (see page 37). He points out how essential the work of the Bureau is to our scientific well being.

• **The New York Times** of February 9 spent several columns to show that industry is becoming more and more tag and label conscious. Among the best known of the certifying organizations is the Underwriters' Laboratories. Next month THE MAGAZINE OF STANDARDS will tell the story of the Laboratories—one of ASA's oldest Members.

This Month's Standards Personality

DR LEONARD GREENBURG, New York City's Commissioner of Air Pollution Control, and recently appointed member of New York State's Board of Air Pollution Control, is a man of four careers. Starting as a Civil Engineer in sanitary engineering, he continued into public health, industrial hygiene, and finally air pollution. He is internationally known for his writings on problems of industrial hygiene and air pollution, for his work on standards to help control contamination of the atmosphere, and for his contribution to the technique of dust sampling as co-inventor of the Greenburg-Smith impinger dust sampling apparatus. This is universally accepted as the standard method for sampling atmospheric dust.

Just out of the Columbia School of Engineering, Dr Greenburg had taken a job as an industrial engineer in a New Haven factory when his attention was called to an opening with the United States Public Health Service. The Service wanted an engineer with industrial experience to work in industrial hygiene and occupational health. "I'd always had a hankering for the kind of medical survey work that such a job promised," Dr Greenburg says, "so I took it." While working with the Service he studied for his Ph.D. at the Yale School of Public Health. His thesis involved dust—but with a medical orientation—its relationship to industrial tuberculosis, and pulmonary diseases. His interest in these problems led him to the study of medicine. He received his M.D. at Yale in 1930.

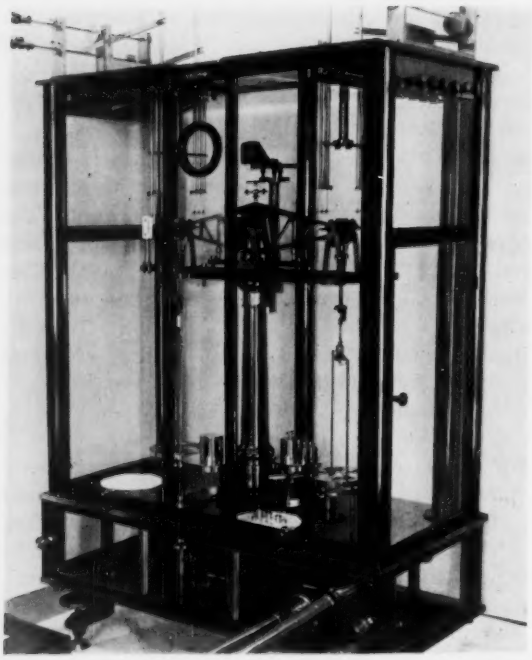
On leaving the USPHS, Dr Greenburg spent two years designing a laboratory for the study of the physiology of ventilation. In 1936 he was appointed Director of Industrial Hygiene and Safety Standards in the New York Department of Labor where he continued until 1952. During this time he was active on a number of committees working to develop American Standards for industrial safety and health. These included permissible concentrations of toxic dusts and gases, industrial lighting (he was the official representative of the International Association of Governmental Labor Officials), industrial sanitation, and exhaust systems. He has been chairman of the committee on protection of heads, eyes, and respiratory organs since 1941. His work with ASA goes back to 1922 when he was a member of the committee on grinding wheel safety. In that same year he worked on ventilation for the House of Representatives and Senate in Washington, D.C. His experience also includes ship ventilation.

Dr Greenburg is convinced that air pollution is as unnecessary as impure water and food. "If we can conquer one we can conquer the other," he says. "It took many years for man to learn the importance of clean water. Now we are beginning to learn the real importance of clean air."

Dr Greenburg has made his views widely known through more than 100 technical papers, and as a member of many groups, both national and international, studying health problems. For his "outstanding contributions to the knowledge and practice of the profession of industrial hygiene," the American Industrial Hygiene Association has honored him with its Donald E. Cummings Memorial Award.

Recently Dr Greenburg has taken up a new interest—higher mathematics—as a hobby, in his spare time.

All Photographs courtesy of the National Bureau of Standards.



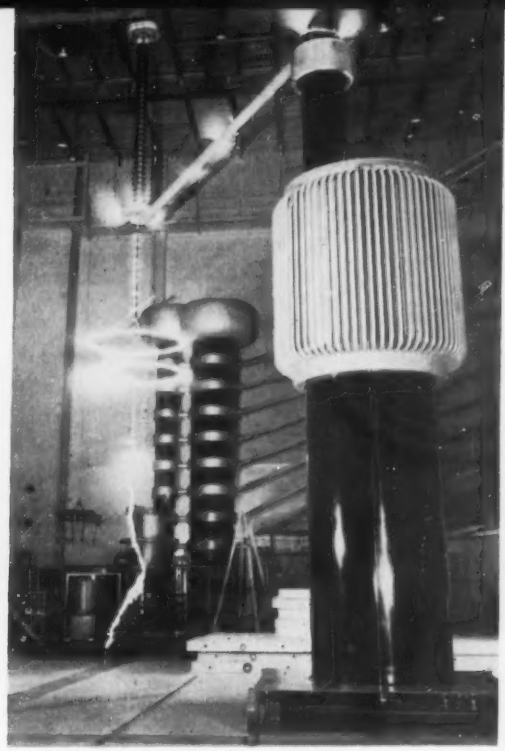
PRECISE MEASUREMENT AND THE RACE FOR TECHNOLOGICAL SUPREMACY

Precise to better than 1 part in 100,000,000, this is most accurate of precision balances at National Bureau of Standards. It is used to compare the national standard kilogram with other secondary standards of mass. It is operated by remote control to avoid errors due to heat of human body.

Studies of basic properties of materials provide background information often valuable to those seeking data upon which to base specifications. Here, the heat conductivity of concrete is being studied. Apparatus used was especially designed by Bureau technicians for this study.

To the left—*Part of the Bureau's data-processing laboratory showing SEAC, the high-speed electronic digital computer. Computer proper (arithmetic and control units and power supply) is in background; magnetic tape auxiliary memory at left; control console and input-output equipment at right.*

All metric measurements of mass in USA are defined by reference to this National Standard (platinum-iridium cylinder); length, by reference to primary standard meter (the distance between two parallel lines engraved on this platinum-iridium bar).



This 1,050,000-volt, 60-cycle, three-unit cascade transformer set in the Bureau's high-voltage laboratory supplies voltage for precise tests of the effective ratio of transformers used in power measurement on high-voltage circuits and for testing insulation of equipment the Government buys.

by **A. V. Astin,**
Director, National Bureau of Standards

This paper, delivered before the Business Advisory Council of the Department of Commerce, December 19, 1957, presents Dr Astin's analysis of the need for greater attention to fundamental standards in light of the progress now being made in the USSR. The version published here consists of excerpts from the original paper.

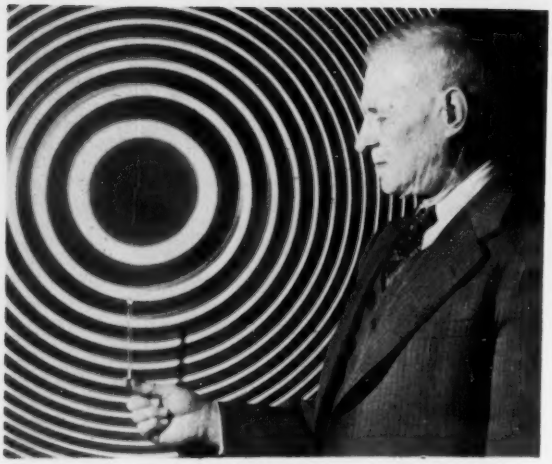
THE DEPENDENCE of technological progress upon advances in measurement techniques is not widely understood or appreciated, although it is an old and fundamental relationship.

Throughout the development of our technological industry, efficiency has increased as the physical characteristics of interchangeable parts have been controlled with greater reliability and precision. Control of dimensional tolerances to ten-thousandth parts of an inch are now as commonplace as control to thousandth parts of an inch were 50 years ago. There is even a pressing need today to control the tolerances of many important and critical elements such as fuel injectors, bearings, gyroscopes, and transistors to tolerances expressed in hundred-thousandths or even millionths of an inch.

Although dimensional control to smaller and smaller tolerances is still a most pressing problem in the fabrication of products such as the navigational and control systems of aircraft and missiles, it is only one of many measurement problems with which modern industry is concerned.

Up until about a hundred years ago industrial measurements were concerned almost exclusively with dimension and weight but the rapid advances in science and the exploitation of these advances by industry has increased the variety of industrial measurement problems by approximately a hundredfold. In the fabrication of today's products it is necessary to control physical characteristics by electrical, electronic, light and color, atomic and nuclear radiation, and chemical measurement techniques. The tremendous growth of a highly specialized instrumentation industry is perhaps the greatest evidence of the importance of measurement to modern technology. In this connection I am quite certain that we would not have been able to develop and build an atomic bomb during World War II had our electronic instrumentation industry not been as advanced as it was.

We have heard a great deal about automation in recent years and its great promise for bringing about major increases in our industrial productivity. Many are inclined to think of automation as something new and modern but the only essentially modern element in automation is a greatly advanced instrumentation technology which makes it possible to measure automatically, accurately, and reliably essential physical characteristics of goods being produced, processing the results of these measurements with modern computing devices and then applying the results of the data processing for decision-making and control in the production line.



Dr W. F. Meggers, chief, NBS Spectroscopy Laboratory, holds spectroscopic lamp containing pure isotope of mercury. Lamps are available to science and industry as ultimate standard of length. Mercury isotope spectrum is enlarged in background.

All physical measurements yield results in the form of numbers, whether the measurements are made in scientific laboratories, in industrial plants, or in the exchange of goods in commerce. If these numbers are to have general meaning and validity they must be based upon common units and standards. It is conceivable that an isolated manufacturer could produce effective products with his own set of measurement standards, but if he buys or sells components from or to others, or if he sells an assembled product guaranteed to meet certain performance requirements, then widely accepted measurement standards must be available. Our industrial economy depends extensively upon specialty manufacturing where products are exchanged on the basis of specified physical characteristics to be determined through measurement. Hence it is essential to have widely accepted measurement standards available to support this interchange.

Standards for measurement are also fundamental to interchange in science because the exchange of data among scientists or the use of the data of scientists by technologists would be ineffective if the measurements were based upon anything other than a commonly accepted set of measurement standards.

The provision of standards for physical measurement has long been recognized as an essential function of government. It was the accepted prerogative of monarchs in the days when the only important standards were those necessary for the orderly exchange of goods in commerce. Our Constitution gives the Congress authority to fix the standard for weights and measures and this responsibility has, in turn, been assigned to the National Bureau of Standards. The responsibility, however, is today much more complex and extensive than it was in the days when the only important measurements dealt with weight, length, and volume. Measurement standards must now be available in all areas of science and technology where physical measurement is important. It is, therefore, axiomatic that the National Bureau of Standards in fulfilling its statutory responsibility should be intensely concerned with all the important processes of measurement.

An agency capable of providing competently the necessary standards for physical measurement is, however, in a somewhat unique position to provide a number of other related and important services to science and industry. This stems from the essential nature of useful standards for physical measurement. A standard more or less by definition represents the ultimate in precision, because the numbers which arise from all measurements are derived from and thus subordinate to the standard. Thus, those concerned with developing the standards and disseminating measurement data from them must excel in precision measurement techniques. This means that scientific and industrial laboratories should be able to look to and properly expect from a national standards laboratory advice and assistance on the effective utilization of advanced techniques in physical measurement. In addition, such competence in physical measurement enables the standards laboratory to make accurate and reliable determinations on the properties of basic materials. The provision of such data is one of the statutory functions of the National Bureau of Standards. The acquisition and dissemination of such data aids materially the work of scientists in other laboratories and of engineers in their design problems.

Let us examine briefly one of the ways in which the ready availability of measurement standards is essential to our modern technology. A modern aircraft or missile system may include as many as a million individual components which are obtained from perhaps as many as 500 separate specialty manufacturers. Each of these components must have certain essential physical performance characteristics and all must work together in an integrated system. Assurance that each component will perform as intended is usually obtained through some sort of measurement. Assurance that the components will operate together as an effective single system is obtained if the instruments which determine their individual or collective properties are based on a common set of measurement standards. Recognizing the importance of this problem to modern aircraft and missile reliability, the Defense agencies have individually initiated programs for the careful and continuous monitoring of all their instruments which control the reliability of the components in their weapons systems. Collectively, they have asked the National Bureau of Standards to provide an up-to-date and continuing calibration service for their individual standard control instruments. A special laboratory has been provided in Boulder, Colorado, for this purpose and will shortly be in operation.

Measurement Activities in the USSR

In discussing Russian activities in the field of measurement and the relationship of such efforts to their

national objectives, I have specifically excluded problems of military strength and preparedness.

Soviet leaders have repeatedly emphasized that their major competitive objective is to overtake and excel the capitalistic nations in productivity per capita. The Russians' announced intention to compete in this area should be of immediate interest to all American industrial leaders because if we are successful in our efforts to maintain world peace, we will most certainly continue to be confronted by their challenge to excel us in terms of industrial productivity.

Although we now excel the Russians substantially in our production of consumer goods we should not be lulled into believing that their technological base is not capable of being developed for such production if their leaders should so decree. The fact that they have surprised us with their ability first to build an A bomb and then an H bomb more quickly than we had expected, and more recently to launch the first earth satellite, should be ample warning that the technological foundation from which these achievements evolved is a very substantial one. Much attention has already been directed to one element of this foundation; namely, their extensive program for training scientists and engineers. Another important element of that foundation is their extensive program in the techniques of physical measurement.

Most of the information I have on this subject comes from the Russian journal *Measurement Engineering*, the official organ of the Committee on Standards, Measures, and Measurement Apparatus of the Council of Ministers of the USSR. Articles in this journal point out that the major objective of the Sixth Five-Year Plan, which began in 1956, is to increase their means of production by approximately 70 percent and their output of consumer goods by approximately 60 percent. During this period there are expected to be substantial increases in the output of basic materials and an increase in the output of their machine tool industry by approximately 80 percent. Fundamental to these increases in productivity, the Plan calls for extensive expansion of their instrumentation industry. All types of electrical, mechanical, optical, radiation measuring instruments, and related instruments for automation will be increased by substantial amounts, averaging about 300 percent.

The entire program of instrument development and production, as well as the means of utilizing effectively their new instruments, is under a Committee on Standards, Measures, and Measurement Apparatus of the Council of Ministers of the USSR. Five research institutes work directly for this committee on new and improved techniques for physical measurement and on the development and maintenance of the basic standards for measurement.

Operating under the supervision of the institutes is a network of calibration centers. Their Plan calls for 129 such centers by 1960.

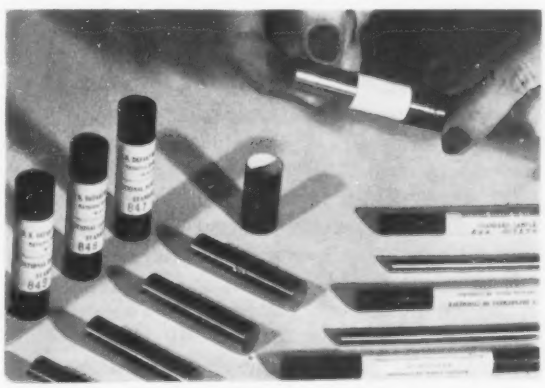
A major function of these calibration centers is to evaluate and approve all of the measuring instruments used in any Russian production plant. One of the available reports includes an item chastizing industry for not measuring up to new precision standards and urging that greater authority be lodged in the regional calibration centers so that they will not only pass on the precision characteristics of the instruments but also upon the way they are used in industrial plants.

Another function of the calibration centers is to make available to industry the latest advances on new measurement techniques derived from the research institutes. This is indeed a substantial chain to insure not only that new measurement techniques are developed and made available but also that they are used effectively.

One series of papers reporting on the results of a Standards and Measurement Conference held in March 1956 reveals that a sizable and high order of technical investment is being made in these areas. The conference dealt principally with standards and measurements as they applied to the machine production industry. More than 500 delegates, including research personnel, were in attendance. The conference, lasting four days, took up some of the most advanced problems in measurement research, problems which indicated the high degree of precision which the Russians were seeking to obtain. Sections were devoted to production precision, interchangeability, and engineering measurement. Special attention was given to the problem of advancing the art of measurement so that it would have a direct impact on Soviet plans for automation. Their discussions of this part of the program reveal a profound understanding and extensive effort on the relationship of precision in the automation of production processes.

A description of their exhibits at the Standards and Measurement Conference reveals appreciable information on the level of their measurement competence.

We are now in the process of comparing some of their levels of achievement with our own, but one area in particular is quite startling. This deals with their competence to make calibrations of temperature-measuring devices.



To control accuracy, analytical and research laboratories use over 550 different standard samples of metals, chemicals, ores, and ceramics prepared, certified, and distributed by the National Bureau of Standards.

In 1956 they claimed to be prepared to make calibrations of temperature-measuring devices up to 6000 C and their Five-year Plan calls for extending this competence to 12,000 C by 1960. At the National Bureau of Standards we have reasonably satisfactory means for providing temperature calibrations only to 2800 C. We have on occasion extended such calibration by impromptu means to 4200 C, but our capability for this and higher temperatures is severely restricted by lack of means of producing high temperatures, since our best device for producing high temperature is a small solar furnace capable of attaining temperatures of about 3500 C.

The Russian's interest and competence in making measurements at such high temperatures is indicative, I believe, of a very substantial effort by them in development activities in this very important technological frontier.

Although our knowledge of some of these Russian activities is still somewhat sketchy, it is possible to draw certain inferences:

(1) The program for standards and precision measurement is operated from a higher governmental level than any other industrial activity in the USSR.

(2) The investment in these areas is extremely large and seems to be especially directed toward fulfilling the precision requirement of complex automatic machine production for intended automation of large segments of the USSR industry.

(3) There appears to be a clear tendency to lean heavily on theoretical analysis of technological problems and in encouraging research and development programs in the instrumentation of precise measurement.

(4) There is a program to inculcate cooperative technological efforts among relevant branches of the economy, including the Ministry of Higher Education, to advance precision measurement throughout industry. It might also be of interest to point out that the 1956 Director of what is apparently the most advanced research institution in machine building technology in the USSR—the Machine Practice Institute of the Academy of Sciences—appears in 1957 as the chief USSR delegate to discuss the IGY Satellite Program at the U.S. National Academy of Science.

These are all matters of serious concern to this nation. Russian achievements in these areas must have an effect upon the American position within the community of nations.

In the areas of measurement and standards, the National Bureau of Standards has a most critical national role. I believe that the Bureau's essential measurement research activities must be substantially strengthened. They must be reviewed in terms of both the Soviet challenge and of effective domestic technological expansion. Quite apart from any direct comparison between Soviet competence and our own, we know of several areas where our inability to provide requested measurement standards services is impeding work of scientists and engineers in other laboratories.

Our research programs relevant to measurement and standards competence cannot be inferior to the central Russian effort if we wish to maintain our competitive position. In spite of the ever ominous military threat, the challenge in the area of basic industrial productivity has been clearly made by the Russians. If this challenge is ignored or treated casually, the world status of our free enterprise economy would be effectively undermined without a missile ever being fired.

There are many aspects to the Soviet productivity challenge: — their system of providing efficient regional calibration services with effective regulatory powers; their system of supporting these calibration services with enlarged theoretical and experimental research programs; and their systems of supporting these research programs with continued educational programs designed to expand this effort.

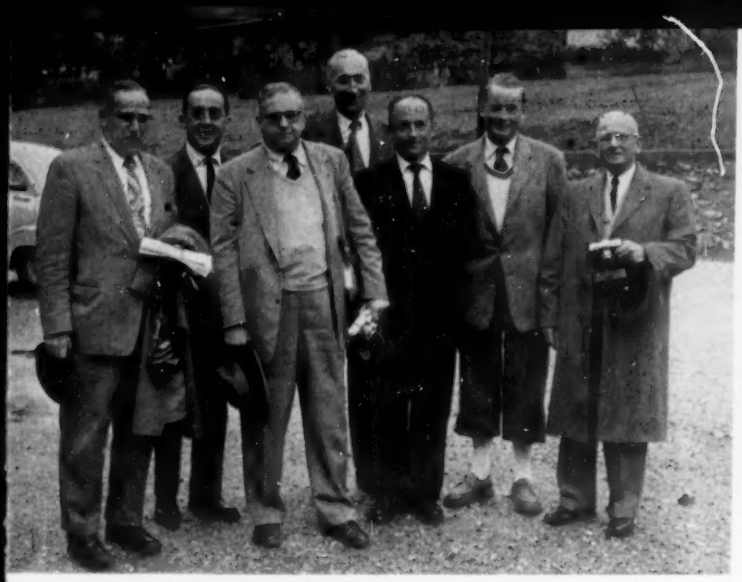
This approach runs counter to many of our basic attitudes towards science and technology and I cannot offer unique measures to meet it.

I believe, however, that both American industry and American Government must increase their effort towards technologic advancement, and they must do so in a cooperative endeavor. I believe that it is industry's essential responsibility to seek to develop its technologic capacity, to call for and to get greater and greater measurement precision when needed, and to organize throughout our industrial complex a more consistent and enlarged system of transferring and applying measurement precision.

I think that industry has a substantive role in meeting this challenge which, under our system of government, cannot be delegated to any government agency. At the same time, I believe that the government has a unique and responsible role in advancing the science of measurement continuously and to the very limits of technology. The interaction of these responsibilities must be accentuated.

One area in which government and perhaps the National Bureau of Standards could provide substantially greater service to industrial technology is that of research, collection, and publication of information on the properties of materials. Industrial organizations and scientific laboratories acquire large amounts of specific information on the behavior of materials under various environmental conditions. Generally such comprehensive collections of scientific and technologic data remain uncollected or unpublished because no specific organization, private or public, has the resources to undertake such work. The Bureau has, within its limited resources, done as much of this as it possibly can. I hope that it can expand these programs appropriately to satisfy the growing demand for such information. I believe it to be one of the essential Federal contributions to technology and one which will be of vital service to America's short supply of scientific personnel.

The economic and technologic aspects of this challenge warrant the full consideration of American industry and business.



A moment off during the hydraulic turbine tests. Left to right: Professor Leslie J. Hooper, M. Serpaud, S. Logan Kerr, Professor Dr Georg Hutarew, M. Perret, M. Willms, James J. Traill.

Special Subcommittee Investigates Thermodynamic Method

Reported by **S. Logan Kerr**
International Chairman of TC 4 of the International Electrotechnical Commission

As the result of a call for information by Technical Committee 4, Hydraulic Turbines, of the International Electrotechnical Commission, a special subcommittee has made a study of the thermodynamic method for determining the efficiency of hydraulic turbines. The subcommittee reported its findings at the 1957 meeting of TC 4, held at Zurich, Switzerland, October 7-10, 1957. On the basis of the subcommittee's report, the thermodynamic method was approved unanimously for inclusion in the International Code, now being prepared by TC 4.

The thermodynamic method, proposed by Poirson in 1914, determines the turbines' efficiency losses by measuring the temperature rise of the water before and after passing through the turbine. Electricité de France set up a program in 1952 to develop this method for testing their numerous hydroelectric plants.

As the method has been used almost exclusively in France, few engineers in other countries have had any experience with its application.

In cooperation with Electricité de France, the International Chairman of Technical Committee 4 arranged for a special subcommittee of IEC/TC4 to witness a thermodynamic test prior to the plenary sessions of the committee in Zurich.

The subcommittee attended a meeting in Grenoble, France, where the theory was explained, inspected the instruments to be used, and reviewed the results of a number of comparative tests made on over 40 installations.

Later the party was taken to the Tignes Dam on the Upper Isere where two plants were tested: Brevieres, with three vertical-shaft Francis-type turbines of 43,600 horsepower each under an average head of 190 meters (623 feet), and Malgovert with four horizontal-shaft Pelton turbines of 105,000 horsepower each under a gross head of 750 meters (2460 feet).

One unit in each plant was tested for the subcommittee, with each member taking observations in turn. The report of the subcommittee was favorable, as a result the method was approved unanimously for inclusion in the International Code at the TC 4 Plenary Sessions, October 7 to 10. An estimated accuracy of better than plus or minus 1.5 percent under heads of 150 meters or higher was agreed upon. Tests under lower heads are permitted under the code by agreement of the parties to the contract.

Actual results show a much higher degree of accuracy than set forth in the code. Extremely close agreement has been found when compared with other means of water measurement carried out simultaneously.

Members of the Special Subcommittee were: Professor Leslie J. Hooper, Alden Hydraulic Laboratory, Worcester Polytechnic Institute, Worcester, Mass. (USA); Professor Dr Georg Hutarew, Technische Hochschule, Stuttgart, (Germany); J. J. Traill, Consulting Engineer, Toronto (Canada).

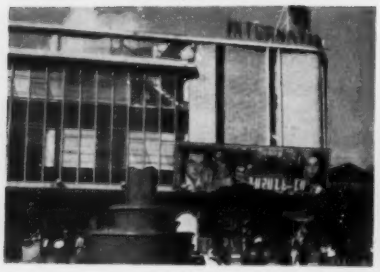
Also present during the tests were M. Serpaud, Test Engineer, NEYRPIC, Grenoble; M. Perret, Service des Usines Hydro-Electrique, de la SNCF, Toulouse (Haute Garonne); and M. Willms, Test Engineer, Electricité de France, Grenoble, France.

Photos Westrex Corp., N.Y.

Djakarta, Indonesia

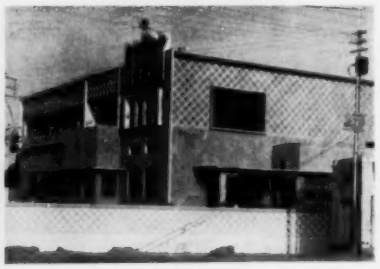
Below—*the unusual Menteng Theatre.*
To the left—*the projection room crew.*

Seoul, Korea



Tokyo, Japan

Multan, Pakistan

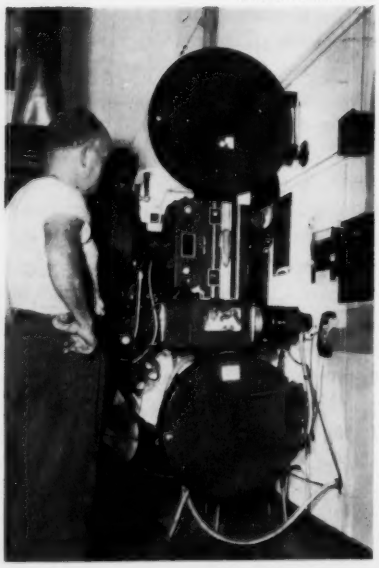


London, England

Photo Warner Bros

Broadway, USA

Photo Warner Bros



HERE is a sampling of theaters in all parts of the world where motion pictures produced in the USA can be shown and are shown because of the highly successful work on standards described in Mr Nemec's article. Imagine the result if the sound track of film produced in one country ran on the opposite side of sound equipment of projectors of another country. This situation actually developed early in the history of sound motion pictures. It was solved because of the active cooperation of the standards committees in the countries concerned.

KEEPING THE MOVIES UP TO STANDARD

This paper was presented at the National Conference on Standards, San Francisco, California, November 13-15. Mr Nemec is a Management Consultant, New York City. He is well acquainted with the standards work on motion pictures and television, having spent a year and a half as staff engineer and nine years as executive secretary of the Society of Motion Picture and Television Engineers. He is now providing management consulting service to both American and foreign companies and corporations with special reference to the use of motion picture and television techniques. He is a Fellow of the SMPTE, a member of the Operations Research Society of America and of the American Management Association, and secretary of Technical Committee 36 on Motion Pictures of the International Organization for Standardization.

by **Boyce Nemec**

CONSIDER a motion picture photographed in a Hollywood studio on camera film made in Rochester, New York, printed in New York City on release print stock made in Parlin, New Jersey, or in Binghamton or Rochester, and projected for pleasure, for business, or for education in a theater, classroom, or television studio in Stockholm, Stuttgart, or Tokyo, or anywhere else on earth. Such a combination of events has been routine in the motion picture industry for more than forty years. Because of this, our film industry offers an interesting study in standardization—not only for "progress and profit," but for survival.

All standards developed and used by the American motion picture industry go through the American Standards Association's mill. Like those adopted and used by the many other branches of industry and science now participating in the federated activities of the ASA, motion picture standards serve any number of formal functions. They range widely in subject matter, covering dimensions of film and equipment, terminology, and procedures for technical test.

Interchangeability

Although the scope of content of these standards is broad, the ultimate purpose of the majority of them is admittedly rather narrow. Their prime function is to provide assurance of current and future interchangeability of the motion picture films manufactured in the United States and thus to permit the world-wide marketing of entertainment feature films and other types of motion pictures produced in this country.

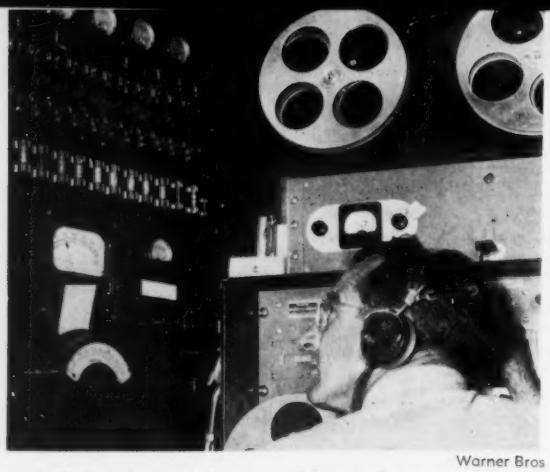
Here we encounter an interesting paradox. Moving pictures whose profitable appeal to the movie-going public depends upon their utter individuality are, at the same time, probably the most completely standardized industrial product circulating through the channels of world commerce. Only one other contender for that honor comes to mind—that is the little spring valve that holds the air in your automobile or bicycle tire.

Interchangeability of films, like that of phonograph records, is concerned first with physical size. Film, like the disc record, must of course fit the machine it is to run on. But, as any hi-fi fan will tell you, there is more to interchangeability than that. One manufacturer of high-quality disc record reproducing equipment advertises that his amplifier provides separate equalization for NARTB, RIAA, LP, AES, Noisy 78, FFRR, and foreign recordings.

Where motion picture sound is concerned, electrical equalization is not much of a problem. Years ago this policy was established: "Standardize the reproducer equipment and let the recording studios do whatever they wish to make their pictures sound best on the standard playback system."

In the realm of sound, primary considerations for interchangeability are: rate of travel of the sound record past the translation point; rate of variation and amount of variation about the nominal, average rate of travel; physical size, location, and conformation of the record medium at its point of translation; absolute level of the recorded signal; and—the one that gives us little trouble—relative level of the recorded signal as a function of frequency.

As to picture, the prime considerations for standardization include the rate at which the individual frames are photographed, projected, and viewed; shape, size, and location of the picture image; density or average opacity of the printed picture; horizontal image compression in films made and shown with anamorphotic lens systems, of which CinemaScope is the most familiar example; and, in the case of color films, the spectral absorption characteristics or color balance of the lights



Warner Bros

Picked up by "mike" on sound boom, dialog and sound effects here go through "mixing" table and are recorded on film, to be joined with picture later in composite print.

used in photography, in printing, and in projection.

This list is by no means conclusive, but it does indicate the range of characteristics with which the motion picture and television engineers must deal when working on standardization problems.

Unstandardized Characteristics

Not all of these characteristics are covered by published American Standards, nor even by standards or proposals at work in the engineering committees of the Society of Motion Picture and Television Engineers or of the Motion Picture Research Council. Some have been studied for a number of years but have been abandoned for lack of concrete progress. Others proved so difficult to tie down or control that they are left, for the time being, to the dictates of conscience at various points along the chain of events that produces a completed motion picture on a theater or television screen.

Certain qualities or characteristics, such as the thickness of motion picture film and the average density of the picture image on the release print, are unstandardized. In the first instance, the dimension is not one of the more critical ones and trade practice appears to meet the requirements of the industry. In the second, there is no agreement about how to make the essential measurements. A standard minimum limit on the level of screen brightness in motion picture theaters has been variously in and out of both categories over the years. It is now under active consideration within the international motion picture technical committee of the International Organization for Standardization (ISO).

The Problem of Physical Variation

Characteristics and dimensions that have been standardized, and for which American Standards are now in active circulation, resemble engineering standards in other fields. However, they all take into account the fact that film is a plastic material, relatively unstable, when compared with the primary materials commonly used in other industries, and subject to physical variations of many kinds. Whether a standard under consideration applies to a piece of film-handling equipment or to the film itself, allowances must be made for the film's inherent intractable nature. The length, width, thickness, flexibility, and surface friction of film change with variations in temperature, relative humidity, and with increasing age. Some of these changes are reversible, others are not.

The experienced equipment designer knows a good bit about the way film behaves. And he adds to his ever-changing knowledge from the supporting information appended to many of the standards. If he has been around for some years, he has seen the average character of film change in many respects as manufacturers developed new base materials and production processes, and as the industry's film users imposed new burdens of light, heat, and mechanical strain on the finished product.

Engineers who do the film industry's standardizing consider it most appropriate that the procedures of the ASA provide for the revision of standards as necessary. This is one industry that takes full advantage of that opportunity.

Equipment designers who follow the trends of change in film characteristics are not always enthralled by what they see. New film base materials developed over the years, tested and introduced to the market, showed progressively less tendency to shrink and stay shrunk and to become more brittle with age. Because of these improvements, sprockets on sound recorders, printing machines, and projectors had to be changed in size and restandardized. In this instance, the removal of an old source of complaint introduced a whole series of new problems. But the change was greatly constructive in the long run and has been welcomed across the board. Still further changes in this direction are now in process.

Participation in Standardization

Standardization in the motion picture industry has been the joint result of engineering effort contributed from all corners of the field. Engineers representing the manufacturer, producing studio, film processing laboratory, and theater owner were active in creating the first formal standardization program back about 1915. And all of these same interests are still actively participating. Additionally, their numbers have been increased by participation of educators, television engineers, and instrumentation specialists as well.

But in spite of the broad and active participation in this work, new standards are almost invariably the result of new evolutionary or imaginative developments that originate at or near the head end of the film- and picture-making process.

The using end, which includes theaters, television stations, schools, the Military, and research and development organizations, participates only secondarily in the creation of technical innovations, and therefore, in pioneering work on standards. The user, almost by definition, is concerned primarily with getting out of each roll of raw stock film or each completed motion picture as much as he can of what was put into it by someone else at some earlier stage in the total process. The inference to be drawn is that standards are

generated at one end of the chain of events and put to work at the other. Although this is not precisely accurate, nor complete, such a pattern is generally observable throughout the history of motion picture standards.

Test Films

For the enlightened motion picture user to do his standards implementing in a professional way, and this implies more than merely passable results, he must be equipped to check his own compliance with the technical provisions of the essential standards and, in addition, he must be able to determine to a useful degree just how well the preceding steps conformed to the accepted standards. He does this largely through the use of motion picture test films, made to meet the provisions of appropriate standards and offered to all comers by two or more neutral suppliers.

If he were a user of tractors, electric motors, or bulk raw materials, he would employ standard gages, measuring instruments, or analytical techniques. And he would express his findings in the language of that particular commercial or technical field. To do all of this he would first have to determine which characteristics contribute to optimum quality or performance. Second, he would set his limiting tolerances, and, last, he would set up his measuring devices.

Exactly this is done in motion pictures. The engineers decide on what to measure, how to measure it, and what limiting tolerances or values to fix on as essential to the maintenance of satisfactory performance in typical situations. Then, since film is the only common element in the total process, and since special attention to the making of film stocks and to the preparation of test materials can produce a picture image or sound record of higher precision than is commonly encountered among commercially produced program films, the engineer makes every effort to create a test film of reliably superior quality. He usually succeeds.

One agency active in this field is the Society of Motion Picture and Television Engineers. Its technical work is done voluntarily by committees with coordinating assistance and quality control provided by the paid staff. Its current test film list includes forty different items in use around the world.

For television there are four black-and-white films used to measure the size of the transmitted picture and certain of the image-forming characteristics of the lens and electronic systems. And there are two color test films made with accurately controlled color balance, color contrast, and lighting contrast that include sections of color materials showing quality obtainable from Technicolor and Eastman prints in 35mm and 16mm widths. A set of 2 x 2 inch color slides indicates the results obtainable from slide materials produced by Eastman and Ansco.

Also made for television are fine grain master positive prints of a threading and identification leader used uniformly by film producers, film laboratories, and television stations. One of these leaders appears as a print from a duplicate negative attached at the head end of each reel of film assembled for television projection. Although not primarily a test film in the customary sense of the word, this leader does give the video control operator an instantaneous and last-second check on the alignment of the film projector and television film-pickup camera and it lets him see the visual effect of the present setting of his picture controls. Additionally, it provides the director with a standard time cue for on-the-air switching.

For the serious user of 16mm motion pictures there are test films for measuring certain aspects of picture reproduction and for measuring the reproduction of magnetic and photographic sound records.

Most versatile of the visual films is a recently developed one for determining the accuracy of picture registration in printers and projectors. Long needed, this 16mm registration test film permits accurate quantitative testing of all performance characteristics that relate to size of the film image, its location with respect to its own sprocket holes and to the edges and sprocket holes of mating films used in the duplicating process, and its location with respect to optical and mechanical parts of such film handling equipment as optical printers, continuous contact printers, step printers, rear screen and front screen projectors, and 16mm television film projectors.

A resolution pattern permits quantitative measurement of the ability of printing and projection systems to reproduce fine lines and sharp edges. The test pattern also has a scale graduated in thousandths of an inch that can be used as a convenient although small "yardstick." One-tenth of an inch long, and transparent, it can be placed in contact with another piece of film to measure such dimensions as sound track width. When the entire frame is enlarged by projection to a screen size of 30 x 40 inches, this "thousandths" scale becomes 10 inches long, and at that enlargement it is possible to measure 16mm film image or aperture dimensions at the screen using a decimal scale. A tenth of an inch becomes 10 inches, a hundredth becomes 1 inch, and a thousandth shows up as one graduation on a 10-to-the-inch scale. High-resolution film stock is used, as is a special sprocket hole perforating technique that insures accurate location of the holes.

Some of our terminology is as picturesque as the films we talk about. An example is one of the problems that occasionally confronts the projection machine designer and service engineer—"travel ghost." Not half so spooky as it sounds, this is the result of poor synchronization between the rotating shutter that cuts off the projector light beam while the film is being moved forward to the next frame and the intermittent sprocket or pull-down device that does the moving. If the shutter is still open a little while the picture image is entering the projection aperture, there will be white streaks below white objects on the screen. These streaks are travel ghost. A test image especially sensitive to this effect is used to check timing. Ideal adjustment is just on the safe edge of a ghosting condition because this yields the maximum

shutter-open time and therefore the longest period of light on the screen and the greatest apparent visual brightness of the projected image.

A glass slide about 1 x 2 inches and coated with a photographic emulsion of exceptionally fine grain carries a pattern of 19 resolution targets in the standard 16mm image area. It is used in a simple static projection device to measure the resolving power of lenses intended for use in 16mm projectors. The individual targets are so fine as to be almost invisible to the unaided eye.

For 16mm sound, there is a whole series of photographic track tests that are useful to engineers who have one or two pieces of electrical test equipment.

A multifrequency film carries a succession of 14 discrete frequencies at accurately determined signal levels and enables the engineer to draw a curve representing the over-all frequency characteristic of a sound reproducer, including the sound-scanning optical system.

A square-wave track, that resembles the rungs of a ladder, comes in two high frequencies and is used on the test bench or in the field to adjust the focus of the sound optics and to orient the optical parts in their cylindrical mount so the thin line of light that scans the sound track is parallel with the ladder rungs photographed in the track area and is therefore exactly at right angles to the direction of film travel.

A buzz-track film makes no sound at all when the track is running in the right location, but it makes a high-frequency or low-frequency buzzing sound if scanning is taking place too near the outside edge of the film or too near the picture. This is a simple "yes or no" gage that requires no test equipment.

Other films measure effective amplification of the reproducer, flutter, and uniformity of illumination along the full length of the scanning light beam which is 0.076 inch long and less than 0.001 inch wide. Flutter refers to variations in the rate of travel of the sound track as it passes the scanning or translation point and is one of the stickiest problems encountered in the motion picture sound test film program. A special piece of electrical test equipment is used in making flutter measurements and a special and carefully defined terminology is used to insure that all participants speak the same language.

Many of the photographic test films have magnetic counterparts that came into existence one at a time as the art of magnetic recording developed. Most basic of the test films in the magnetic group is one that gave practitioners their first absolute reference for the level of the recorded signal. For the original work that produced this outstanding result, the industry is deeply indebted to a research group in the acoustics laboratory at the Brooklyn Navy Yard. Today nearly all sound recording for motion pictures is done with magnetic materials and techniques. This uniquely developed film permits a direct comparison of magnetic coatings and methods in terms of a single primary reference point.

Parallel test film activities of the Society of Motion Picture and Television Engineers and of the Motion Picture Research Council provide a full complement of test films and testing procedures for the 35mm theater field. Uniformly high level in the technical quality of pictures and sound reproduced in theaters throughout the world is not difficult to achieve and maintain because the makers and users of the technical equipment involved are actively engaged in the development of uniform test films and test procedures.

Installation and service engineers who apply their ample professional skills and experience to the electrical, electronic, and mechanical aspects of film reproduction, and who use standard test films to measure the quality of their own work, as well as the quality of performance of the equipment they work on, are the individuals who are truly "keeping the movies up to standard."

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Sectional Committee PH22 handles the development of American Standards for motion picture and television film and equipment. The committee is sponsored, under the procedures of the American Standards Association, by the Society of Motion Picture and Television Engineers. Dr D. R. White, Photo Products Department, E. I. du Pont de Nemours & Company, Parlin, N. J., is chairman of the committee, with J. Howard Schumacher, Society of Motion Picture and Television Engineers, as secretary.

Most recently published new American Standard under jurisdiction of Sectional Committee PH22 is American Standard PH22.106-1957, Projector Aperture for 35mm, Anamorphic, 2.35:1 Prints with Squeeze Ratio of 2:1. This standard was originally limited to the CinemaScope process but was changed in order to have a broader application to 35mm anamorphic films. Four dimensions of film for projection with this aperture are given in the standard, with perforations as specified in American Standard PH22.1-1953 or in American Standard PH22.36-1954.

Also recently published was an American Standard specifying the location and dimensions of variable area and variable density sound records for the photographic printing of sound on 35mm sound motion picture prints. It specifies the area scanned in the sound reproducer.

International recommendations for motion picture film and equipment are under the jurisdiction of ISO Technical Committee 36 on Cinematography. The American Standards Association holds the secretariat for this committee. A number of ISO Recommendations, R23-R29, have already been approved and published. These were based on American Standards Z22.2-1946, Z22.3-1946, Z22.9-1946, Z22.10-1946, Z22.15-1946, Z22.21-1946, and Z22.22-1947.

The PH22 Committee under the sponsorship of the Society of Motion Picture and Television Engineers is the American group that presents the USA viewpoint on the work being done by ISO Technical Committee 36. SMPTE engineering committees have suggested several new items for consideration at the next meeting of TC36 at Harrogate, England, June, 1958.

T. E. Veltfort

VELTFORT AND MASSEY HEAD STANDARDS COUNCIL

T. E. Veltfort, managing director of the Copper and Brass Research Association, is the newly elected chairman of ASA's Standards Council. Harold Massey, managing director, Gas Appliance Manufacturers Association, is new vice-chairman.

The Standards Council is responsible for the technical program of the American Standards Association. Its members are representatives of the 65 national industrial, technical, and consumer organizations that are the governing members of the Association.

Mr Veltfort has represented the Copper and Brass Research Association on the Council since 1938. He was a member of the Council's Board of Review from 1949-1955, and served as chairman for two terms. He has also served as chairman of the Council's Committee on Procedure, which reviews and makes recommendations on needed changes in the procedures under which new standardization projects are initiated and standards approved by the American Standards Association.

Mr Veltfort has been with the Copper and Brass Research Association since 1933. This association has 50 members that comprise essentially the entire brass mill industry in this country.

He is a past president of the Trade Association Executives of New York City and of the American Trade Association Executives (now American Society of Association Executives), and past chairman of the Advisory Council on Federal Reports.

Mr Veltfort is a graduate engineer with B.S. and C.E. degrees from New York University. Before entering trade association work he had extensive engineering, construction, organization, business research and analysis experience in various departments of the Stone and Webster Engineering Corporation.

Mr Massey has been managing director of the Gas Appliance Manufacturers Association since October 1955, and has been a member of the Standards Council since 1950. Before joining the GAMA in 1946 as assistant managing director, he was gas equipment sales manager for the American Radiator and Standard Sanitary Corporation in Pittsburgh. There he was in charge of design, engineering, and sales of domestic and large-volume automatic gas water heaters, boilers, furnaces, air conditioners, and conversion burners. Before this he was chief engineer with the Standard Gas Equipment Corporation, where his duties included development and production of domestic and commercial cooking equipment and industrial gas burners.

Mr Massey is a director of the American Society of Association Executives and a former vice-president of the Trade Association Executives in New York. He holds an M.E. degree from Stevens Institute of Technology.

Members of the Board of Review for 1958 are: E. R. Granniss, Manager, Loss Prevention Department, Royal-Liverpool Insurance Group; Perry L. Houser, President, Metal Cutting Tool Institute; L. E. Knowlton, Executive Vice-President, Providence Gas Company; Leon M. Podolsky, Sprague Electric Company; J. D. Rogers, Superintendent of Communication, New York, New Haven, & Hartford Railroad; C. A. Willson, Research Engineer, American Iron and Steel Institute. C. W. Franklin, Consolidated Edison Company of New York, is an alternate member of the Board.

Harold Massey

James C. Lawrence, Sr.

M. J. Pitre

Matthew J. Murphy

Earnest R. Johnson

Richard W. Summey

Harold R. Huntley

H. Thomas Hallowell, Jr., *elected president of ASA for third term*

John R. Townsend, *newly elected ASA vice-president.*

New ASA

Officers and Directors

H. Thomas Hallowell, Jr, president of the Standard Pressed Steel Company, Jenkintown, Pa., began his third consecutive term as president of the American Standards Association January 1, 1958.

John R. Townsend, special assistant, Office of Assistant Secretary of Defense (Research and Engineering), began his first term as vice-president. He succeeds Van H. Leichliter, president of the American Wire and Steel Division, U.S. Steel Corporation. Mr Townsend recently accepted his present assignment with the Department of Defense, after five years as director of materials and standards engineering at Sandia Corporation. He was granted a leave of absence from the Bell Telephone Laboratories in 1952 to take on the work at Sandia. He is now also serving as director of the Office of Fuels, Materials, and Ordnance.

Mr Townsend has been associated with the work of the American Standards Association since 1933. He served as chairman of the Standards Council from 1952-1954 and as a member of the Board of Directors since 1952. He is a past president of the American Society for Testing Materials. The citation for award of the Standards Medal, which Mr Townsend received in 1957, states that "For almost 40 years, he has dedicated his profound knowledge, vast experience, and untiring energy to the development and formulation of practical engineering standards for the United States and its allies . . . During his five-year service as director of materials and standards engineering of the Sandia Corporation, he carried forward important pioneering work in the development and application of standards in the field of nuclear energy."

Newly elected to three-year terms as members of ASA's Board of Directors are J. C. Lawrence, Moylan, Pennsylvania; Harold R. Huntley, chief engineer, American Telephone and Telegraph Company; Matthew J. Murphy, editor, *Factory Management*, McGraw-Hill Publishing Company; and Richard W. Summey, vice-president in charge of manufacturing, Bridgeport Brass Company. Mr Lawrence was nominated by the American Institute of Chemical Engineers; Mr Huntley by the Telephone Group (U.S. Independent Telephone Association and Bell Telephone System); Mr Murphy is a member-at-large; and Mr Summey was nominated to membership on the Board by the Copper and Brass Research Association.

E. R. Johnson, vice-president—Operation, Republic Steel Corporation, Cleveland, Ohio, was elected to complete the unexpired term of W. A. Steele. Mr Johnson, nominated by the American Iron and Steel Institute, will serve until December, 1958.

M. J. Pitre, vice-president, Fidelity and Casualty Company of New York, nominated by the Association of Casualty and Surety Companies, will complete the term of G. L. Kerr, who has retired.

Vincent deP. Goubeau and John R. Dube have both been re-elected. Mr Goubeau, nominated by the National Association of Purchasing Agents, is vice-president, Radio Corporation of America, and Mr Dube, nominated by the Air-Conditioning and Refrigeration Institute,

is president, Alco Valve Company.

Mr Lawrence, a graduate of the University of Missouri (A.B.-B.S.Ch.E.) and of the Royal Technical College, Glasgow, Scotland, started his professional career with the U.S. Forest Service, Forest Products Laboratory, Madison, Wisconsin. From 1911-1914, he worked for the Forest Products Chemical Company of Memphis, Tennessee. During the first World War he was on loan to the British Ministry of Munitions, working both in Glasgow, Scotland, and in London. On return to the USA, he joined the Engineering Department of E. I. du Pont de Nemours & Company. His career there included work as Process Engineer, Design Division; Project Engineer; Supervising Engineer; Division Engineer; and from 1946 until his retirement in July, 1953, in charge of Chemical Engineering Consultants.

His first activity in ASA was with the original Company Member Conference. He was one of the original members who organized the Chemical Industry Advisory Board and is now a member-at-large of CIAB. In addition to membership on the ASA Board of Directors, he is a member of the Standards Council of ASA, representing the American Institute of Chemical Engineers. He also is active in the technical work as a member of several sectional committees.

Mr. Lawrence is a member of the American Institute of Chemical Engineers and at present is chairman of the Institute's Standards Committee. He is also a member of the U.S. Naval Institute, the American Petroleum Institute, and the National Society of Professional Engineers.

Since his retirement Mr Lawrence has been doing some consulting work, mostly, he explains, on matters in which he has a special interest.

Mr Huntley is chief engineer of the American Telephone and Telegraph Company. He entered the Bell System in 1917, working as transmission and protection man, and was graduated from the University of Wisconsin with a B.S. degree in 1921. Working first with the Wisconsin Company, he moved to the parent company as group head in the Plant Engineering Division, Foreign Wire Relations Section, in 1930. There he handled inductive coordination matters with power organizations. In 1942 he became group head in charge of electrical coordination in the Transmission Section, changing to head of toll transmission in 1946. Following work as transmission engineer, he became assistant chief engineer, then director of customer products planning, and progressed to his present position as chief engineer, last year.

Mr Huntley is a Fellow of the American Institute of Electrical Engineers and a senior member of the Institute of Radio Engineers.

Mr Murphy has his Ph.D. from New York University. He has been editor of *Factory Management*, McGraw-Hills, since 1953, and is chairman of the McGraw-Hill Editorial Board. Author of numerous articles on personnel and production management, executive development, and related topics, he is also co-author of two books, *Bargaining with Organized Labor,* and *Job Evaluation and Employee Rating.* Mr Murphy started his career as instructor and assistant professor of the School of Commerce, New York University. In 1940 he became personnel manager and training and research director for Bendix Radio. He joined the staff of McGraw-Hill in 1948 as associate editor of *Factory Management and Maintenance.*

Mr Murphy was general chairman for the American Society of Mechanical Engineers for the 11th Annual Management Engineering Conference. He is a former vice-president of the Materials Handling Division of the Society for the Advancement of Management, and a former member of the American Management Association's Personnel Planning Council.

Mr Summey has been with the Bridgeport Brass Company since 1942 when he joined the company as an engineer handling casting problems. He supervised the initial operation of the continuous casting machines when they were installed at the Bridgeport, Connecticut, plant. In 1947 he was placed in charge of production at the Noranda Copper and Brass, Ltd, in Montreal, and became manager of the plant in 1950. He was elected a vice-president of the Bridgeport Brass Company in 1955, and vice-president and general manager of Noranda the following year. In 1957 he became vice-president in charge of all manufacturing for the Bridgeport Brass Company. He continues, however, to direct the activities of the Montreal facility.

Mr Johnson joined the Central Steel Company at Massillon, Ohio, a predecessor of the Republic Steel Corporation, on his graduation from the University of Michigan with an M.S. degree in 1922. He became assistant superintendent of the Metallurgical Laboratory in 1926, and three years later was made assistant chief metallurgist. His activities expanded when in 1944 he was appointed chief metallurgist for the Central Alloy District of Republic Steel Corporation. Two years later he was made assistant district manager, and later manager of the Central Alloy District. He became assistant vice-president in charge of operations with jurisdiction over Republic's eight basic steel plants, in 1953. He has been vice-president in charge of operations since 1954.

Mr Pitre, nominated to the ASA Board by the Association of Casualty and Surety Companies, entered the insurance field in 1929 as supervising engineer for the Union Indemnity Company. However, he joined the America Fore Insurance Group in 1931 in St Louis as district supervising engineer for the Fidelity and Casualty Company of New York and transferred to the Home Office in New York City in 1933. He became a vice-president of the company in 1955.

Mr Pitre is a member of the Advisory Committee of the Accident Prevention Department of the Association of Casualty and Surety Companies. He is also a member of the American Society of Safety Engineers and the American Society of Mechanical Engineers.

books....

Cast Metals Handbook. *By American Foundrymen's Society. Fourth edition. 1957. 316 pages. American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Illinois.* $10.00

Completely reworked and substantially augmented, the new fourth edition of the Cast Metals Handbook brings existing information on cast metals up to date. The Handbook is compiled specifically to enable the user of cast metals to select the material best suited for his purpose. It gives information to facilitate cooperation between the users and the foundries in order that castings will best meet engineering requirements. The Handbook recognizes the available American Standards, ASTM standards, and others through numerous references to standardized specifications and test methods including a new and useful cross index of equivalent ferrous and nonferrous casting alloys and specifications. The cross index appears in the general section which also treats generally the properties of cast metals, the principles of casting design and other related subjects. The remaining five sections of the handbook deal respectively with gray and white cast iron, malleable cast iron, modular cast iron (a new section), steel castings and nonferrous alloys. For each of the different cast metals considerable information is given with regard to metallurgy, methods of manufacture and properties of the cast metal.

Proposed Recommendations on Form of ASTM Specifications. *April 1957. 6 pp. 6 x 9. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.*

In this important little pamphlet, the American Society for Testing Materials states its philosophy on specifications and recommends the outline as well as the type of material to be included in a specification approved by ASTM. It is primarily intended for use by members of ASTM committees who are working on proposed ASTM specifications.

"A specification may be defined as a concise description, preferably in measurable terms, of the significant characteristics of a material," ASTM says. "The determination of such needs in terms of characteristics that can be set up easily in a specification requires logical thought based on sound chemical and engineering principles."

Decisions based on personal opinion should be reduced to a minimum and therefore requirements should be set forth in a clear, detailed but concise manner and should be quantitative rather than qualitative, it is recommended.

The five important requisites of a specification as outlined by ASTM are: Accuracy and precision; workability; suitability; flexibility; and acceptability. Also, ASTM states: "A specification should never be considered as final nor complete. Frequently an outmoded specification will prove a greater deterrent to progress than no specification at all. Any specification should be examined periodically, in view of technological advances in manufacture, testing, and use requirements."

In addition to scope, definitions of terms, chemical and physical requirements, dimensions, weights, and permissible variations, the list of subjects to be covered includes optional requirements as a basis of purchase, specifications for packing, marking, and shipping, as well as for inspection, certification, and rejection and rehearing.

Concerning the word "specifications" itself, ASTM points out: "The plural form 'specifications' has been used for many years; however, the singular form 'specification' is now preferred on the basis that the series of requirements constitute a single document."

Recommendations for Mercury-arc Converters. *IEC Publication 84. 1957. First edition. International Electrotechnical Commission, 1 rue de Varembé, Geneva, Switzerland. (Copies available from American Standards Association, 70 E. 45th St., New York 17, N.Y.* $6.00

These Recommendations apply to converters for conversion of alternating current to direct current with total rated power of at least 50 kw, rated direct current of at least 10 amperes and rated direct-current voltage up to 5000 volts.

The recommendations deal with five major sections. Section 1—definitions and general information; Section 2—Valves and their service conditions, temperature limits, output in relation to adjustment of d-c voltage, tests, valve losses, maintenance of vacuum, insulation tests and rating plate. Section 3 — converter transformers insofar as their characteristics differ from those of ordinary power transformers, containing the following clauses: general, tests, losses and voltage drops in the transformer and reactor, insulation test and rating plate. Section 4—converters and their rating classification, efficiency, power factors, inherent and total voltage regulation, harmonics and associated effects. Section 5—tolerance.

Recommendations for Tests on Impregnated Paper-Insulated Metal-Sheathed Cables for Voltages of 10kV to 66kV. *IEC Publication 55. 1957. Second edition. International Electrotechnical Commission, 1 rue de Varembé, Geneva, Switzerland. (Copies available from American Standards Association, 70 E. 45th St., New York 17, N.Y.)* $2.00

The test specifications given herein cover routine tests such as conductor resistance test; high-voltage test at works; dielectric power factor test at ambient temperature; high-voltage test after laying. Mechanical tests and dielectric security tests are provided, to be carried out on short sample lengths removed from cables manufactured to the contract. In addition, a test of dielectric power factors at various temperatures is outlined to determine whether a cable is to be accepted as an approved type.

ASTM Standards on Copper and Copper Alloys. *1957. 6 x 9. 688 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.* $6.25

A new edition of the special compilation of ASTM standards covering copper and copper alloys, cast and wrought, has been developed by

ASTM Committee B-5. Thirty-four of the 128 standards included in the now obsolete December 1955 edition were revised in 1956 and 1957, and the revised standards are in the new edition. Also included for the first time are specifications for threadless copper pipe and for copper drainage tube.

Products covered include: Basic coppers, non-ferrous metals used in the manufacture of copper alloys, copper and copper alloy wrought products including electrical conductors, copper alloy ingots and castings, and copper and copper alloy filler metal. Test methods for these materials accompany the specifications.

Screw-Thread Standards for Federal Services, 1957. *NBS Handbook H28 (1957) — Part I. 214 pp. U.S. Government Printing Office, Washington 25, D. C.* $1.25

This publication, the work of the Interdepartmental Screw Thread Committee, sponsored by the Departments of Defense, Army, Navy, Air Force, and Commerce, is issued to promote uniformity in screw-thread standards in the departments concerned. The Handbook is based on the 1933 and earlier reports of the National Screw Thread Commission and NBS Handbooks H25 and H28 (1942 and 1944), which superseded those reports and which the Handbook supersedes, together with pertinent standards approved and promulgated by the American Standards Association. Its purpose is to present complete dimensional data upon which specifications may be based for threaded products for Government requirements. So far as practicable, these data are intended to conform to generally accepted commercial practice, although certain special requirements of the Government necessitate the inclusion of some standards not generally applicable outside the Government services.

Liaison representatives of ASA Sectional Committees B1, Screw Threads, B2, Pipe Threads, and B18, Bolts, Nuts, Rivets, Screws and Similar Fasteners, work with the Government representatives to keep the Handbook up to date with work being done on American Standards. References are cited throughout the text to the American Standards approved by the American Standards Association.

WHAT IS YOUR QUESTION?

Would the job-oriented manuals[1] be in addition to equipment-oriented manuals? Would details of circuit theory, overhaul, etc, be in separate books?

There will definitely be equipment-oriented manuals used in addition to the job-oriented manuals, in fact, job-oriented manuals will probably constitute only 10-20 percent of a total publication effort on any one weapon system. Any operational base or depot, which performs repair or overhaul maintenance would need equipment-oriented manuals covering the material. Details of circuit theory and overhaul would normally be in equipment-oriented books. Circuit function, however, would be reflected in data flow diagrams and schematics reflecting the maintenance capability of the job, in the job-oriented manual.

[1]This refers to the description of the new approach to manual-writing described by D. R. McDowell at the National Conference on Standards, San Francisco, California, November 13-15, 1957 (MAG OF STDS, December 1957, p 372). Mr McDowell spoke at the session on Standardization for Technical Communication.

What are the major criticisms by the military on inadequacy of technical manuals?

The major criticisms have to do with, first, inaccuracy due to reasons such as obsolescence in addition to pure error; second, inappropriateness of content with too much basic theory and design information for the intended use; and third, too much concentration on the mechanics of production with too little emphasis on the content and usability of the data.

Wherein lies the responsibility in a company to establish the acceptable sources of supply—in purchasing, quality control, or engineering standards?

The relations of purchasing, quality control, and engineering standards should be closely coordinated in determining acceptable sources of supply.

It should be the prerogative of engineering standards, in cooperation with quality control and purchasing, to agree upon and set up suitable purchase specifications, or standards.

However, the final responsibility of deciding upon the vendors, is that of purchasing. Naturally, in making the decision, purchasing will give due consideration to the opinions and recommendations of all concerned with the use of the products being purchased.

When materials have been purchased, it becomes the responsibility of quality control to inspect and check for adherence to specifications, and to make such reports as necessary regarding the quality of the products to purchasing.

—Reply by H. E. Cross to question asked at National Conference on Standards.

Is the job-oriented manual trend entering into other fields than missiles and rockets?

There has been interest expressed by a number of military agencies, particularly by other Air Force Commands. It seems generally that, wherever the weapons systems concept is recognized, the job-oriented manual will be of interest. The fact that the Air Material Command is working on a specification for job-oriented manuals is an indication of its formal recognition within the Armed Services. *—D. R. McDowell*

AMERICAN STANDARDS UNDER WAY

Status as of January 22, 1958

Legend — *Standards Council* — Approval by Standards Council is final approval as American Standard; usually requires 4 weeks. *Board of Review*— Acts for Standards Council and gives final approval as American Standard; action usually requires 2 weeks. *Standards Board* — Approves standards to send to Standards Council or Board of Review for final action; approval by standards boards usually takes 4 weeks.

Note — Send check when ordering standards listed as published to avoid service charge for handling.

ACOUSTICS, VIBRATION, AND MECHANICAL SHOCK

American Standards Approved

Laboratory Measurement of Airborne-Sound Transmission Loss of Building Floors and Walls, Practice for, Z24.19-1957

Real-Ear Attenuation of Ear Protectors at Threshold, Method for the Measurement of, Z24.22-1957

Calibration of Electroacoustic Transducers, Particularly Those for Use in Water, Procedures for, Z24.24-1957
Sponsor: Acoustical Society of America

BUILDING AND CONSTRUCTION

American Standard Published

Welded Steel Wire Fabric for Concrete Reinforcement, Tentative Specifications for, ASTM A 185-56T; ASA G45.1-1957 (Revision of ASTM A 185-37; ASA G45.1-1942) $0.30
Sponsor: American Society for Testing Materials

American Standards Approved

Gypsum Plasters, Specifications for, ASTM C 28-57; ASA A49.3-1958 (Revision of ASTM C 28-55; ASA A49.3-1956)
Sponsor: American Society for Testing Materials

Billet-Steel Bars for Concrete Reinforcement, Specifications for, ASTM A 15-57T; ASA A50.1-1958 (Revision of ASTM A 15-54T; ASA A50.1-1956)

Rail-Steel Bars for Concrete Reinforcement, Specifications for, ASTM A 16-57T; ASA A 50.2-1958 (Revision of ASTM A16-54T; ASA A50.2-1956)
Sponsor: American Society for Testing Materials

Structural Clay Load-Bearing Wall Tile, Specifications for, ASTM C 34-57; ASA A74.1-1958 (Revision of ASTM C 34-55; ASA A74.1-1956)
Sponsor: American Society for Testing Materials

Structural Clay Non-Load-Bearing Tile, Specifications for, ASTM C 56-57; ASA A76.1-1958 (Revision of ASTM C 56-52; ASA A76.1-1953)
Sponsor: American Society for Testing Materials

Structural Clay Floor Tile, Specifications for, ASTM C 57-57; ASA A77.1-1958 (Revision of ASTM C 57-52; ASA A77.1-1953)

Brick, Methods of Sampling and Testing, ASTM C 67-57; ASA A82.1-1958 (Revision of ASTM C 67-50; ASA A82.1-1951)
Sponsor: American Society for Testing Materials

Building Brick (Solid Masonry Units Made from Clay or Shale), Specifications for, ASTM C 62-57; ASA A98.1-1958 (Revision of ASTM C 62-50; ASA A98.1-1953)
Sponsor: American Society for Testing Materials

Facing Brick (Solid Masonry Units Made from Clay or Shale), Specifications for, ASTM C 216-57; ASA A99.1-1958) (Revision of ASTM C 216-50; ASA A99.1-1953)
Sponsor: American Society for Testing Materials

Inorganic Aggregates for Use in Gypsum Plaster, Specifications for, ASTM C 35-57T; ASA A107.1-1958 (Revision of ASTM C 35-54T; ASA A107.1-1956)
Sponsor: American Society for Testing Materials

Insulating Fire Brick, Classification of, ASTM C 155-57; ASA A111.22-1958 (Revision of ASTM C 155-47; ASA A111.22-1955)
Sponsor: American Society for Testing Materials

Axle-Steel Bars for Concrete Reinforcement, Specifications for, ASTM A 160-57T; ASA G43.1-1958 (Revision of ASTM A 160-54T; ASA G43.1-1956)
Sponsor: American Society for Testing Materials

High-Strength Steel Castings for Structural Purposes, Specifications for, ASTM A 148-57; ASA G52.1-1958 (Revision of ASTM A 148-55; ASA G52.1-1956)
Sponsor: American Society for Testing Materials

In Standards Board

Fire Tests of Door Assemblies, Methods of, ASTM E 152-56T; ASA A2.2- (Revision of ASTM E 152-55T; NFPA 252; ASA A2.2-1956)
Sponsors: National Bureau of Standards; National Fire Protection Association; American Society for Testing Materials

CHEMICAL INDUSTRY

American Standards Approved

Chemical Analysis Alkaline Detergents, Methods of Sampling, ASTM D 501-57; ASA K60.21-1958 (Revision of ASTM D 501-55; ASA K60.21-1956)
Sponsor: American Society for Testing Materials

Common Name for the Pest Control Chemical O,O,O',O' - tetraethyl S,S'-methylene bisphosphorodithionate, (ethion) K62.12-1958
Sponsor: U. S. Department of Agriculture

In Standards Board

Common Name for the Pest Control Chemical 3 - phenyl-1,1 - dimethylurea (fenuron) K62.7-
Sponsor: U. S. Department of Agriculture

DRAWINGS, SYMBOLS, AND ABBREVIATIONS

American Standards Published

American Drafting Standards Manual, Section 3, Projections, Y14.3-1957 $1.50

Section 6, Screw Threads, Y14.6-1957 $1.50
Sponsors: American Society of Engineering Education; American Society of Mechanical Engineers

ELECTRIC AND ELECTRONIC

American Standards Published

Definition of Electrical Terms, C42
Group 40, Transportation, General, C42.40-1956
Group 41, Transportation—Air, C42.-41-1956
Group 42, Transportation — Land, C42.42-1956
Group 43, Transportation — Marine, C42.43-1956 (*in one volume*) $1.40
Sponsor: American Institute of Electrical Engineers

Overhead-Type Distribution Transformers 67,000 Volts and Below, 500 kva and Smaller, Requirements for, C57.-12c-1957 (as Section 20 of ASA C57.-12-1956) $2.00
Sponsor: Electrical Standards Board

American Standards Approved

Specialty Transformers, Safety Standard for, C33.4-1958 (Revision of C33.4-1956)
Sponsor: Underwriters' Laboratories

Laminated Tubes Used for Electrical Insulation, Methods of Testing, ASTM D 348-56; ASA C59.14-1958 (Revision of ASTM D 348-52; ASA C59.14-1954)

Laminated Round Rods Used for Electrical Insulation, Methods of Testing, ASTM D 349-56; ASA C59.15-1958 (Revision of ASTM D 349-52; ASA C59.15-1954)

Electrical Insulating Oils, Method for Sampling, ASTM D 923-56; ASA C59.-21-1958 (Revision of ASTM D 923- 49; ASA C59.21-1951)

Natural Block Mica and Mica Films Suitable for Use in Fixed Mica-Dielectric Capacitors, Specifications for, ASTM D 748-54T; ASA C59.26-1958 (Revision of ASTM D 748-52T; ASA C59.26-1954)
Sponsor: American Society for Testing Materials

In Board of Review

Fluorescent Lamp Ballasts, Specification for, C82.1- (Revision of C82.1-1956)
Sponsor: Electrical Standards Board

In Standards Board

Apparatus Bushings (Used with Power Circuit Breakers and Outdoor Transformers) Dimensional and Electrical Characteristics of, C76.1a- (Supplement and partial revision of C76.1-1943)
Sponsor: American Institute of Electrical Engineers

96 Inch (800 ma) T-12 Rapid Start Fluorescent Lamp, Dimensional and Electrical Characteristics of, C78.702-

72 Inch T-12 Rapid Start (Recessed Double Contact) Fluorescent Lamp, Dimensional and Electrical Characteristics of, C78.703-
Sponsor: Electrical Standards Board

Piezoelectric Vibrator, Methods of Measurement and Definition of, C83.17-

Fixed Wire-Wound Power Resistors, Requirements for, C83.18-
Sponsor: Electronic Industries Association

Withdrawal Being Considered

Apparatus Bushings (Used with Power Circuit Breakers and Outdoor Transformers), Electrical and Mechanical Characteristics of, C37.4a-1954
Sponsor: Electrical Standards Board

GAS-BURNING APPLIANCES

American Standards Published

Addenda (Z21.1.1a-1957) to American Standard Approval Requirements for Domestic Gas Ranges, Volume I, Free Standing Units, Z21.1.1-1956 $0.50

Addenda (Z21.1.2a-1957) to American Standard Approval Requirements for Domestic Gas Ranges, Volume II, Built-In Domestic Cooking Units, Z21.1.2-1956 $0.50

Addenda (Z21.3a-1957) to American Standard Approval Requirements for Hotel and Restaurant Gas Ranges and Unit Broilers, Z21.3-1956 $0.40

Addenda (Z21.13.1a-1957) to American Standard Approval Requirements for Central Heating Gas Appliances, Volume I, Steam and Hot Water Boilers, Z21.13.1-1956 $0.40

Addenda (Z21.13.2a-1957) to American Standard Approval Requirements for Central Heating Gas Appliances, Volume II, Gravity and Forced Air Central Furnaces, Z21.13.2-1956 $0.50

Addenda (Z21.13.3a-1957) to American Standard Approval Requirements for Central Heating Gas Appliances, Volume III, Gravity and Fan Type Floor Furnaces, Z21.13.3-1956 $0.40

Addenda (Z21.13.4b-1957) to American Standard Approval Requirements for Central Heating Gas Appliances, Volume IV, Gravity and Fan Type Vented Recessed Heaters, Z21.13.4-1955 and Addenda Z21.13.4a-1956 $0.40

Gas Unit Heaters, Approval Requirements for, Z21.16-1957 (Revision of Z21.16-1956) $2.00

Addenda (Z21.27b-1957) to American Standard Approval Requirements for Hotel and Restaurant Deep Fat Fryers, Z21.27-1955 and Addenda Z21.27a-1956 $0.15

Addenda (Z21.28a-1957) to American Standard Approval Requirements for Portable Gas Baking and Roasting Ovens, Z21.28-1956 $0.40

Addenda (Z21.31a-1957) to American Standard Approval Requirements for Gas Counter Appliances, Z21.31-1956 $0.40

Addenda (Z21.34b-1957) to American Standard Approval Requirements for Gas-Fired Duct Furnaces, Z21.34-1955 and Addenda Z21.34a-1956 $0.40

Gas Conversion Burners for Domestic Ranges, Listing Requirements for, Z21.39-1957 (Revision of Z21.39-1953 and Z21.39a-1955) $2.00
Sponsor: American Gas Association

American Standard Approved

Domestic Gas-Fired Incinerators, Approval Requirements for, Z21.6-1957 (Revision of Z21.6-1955)
Sponsor: American Gas Association

MATERIALS HANDLING

American Standard Approved

Conveyor Terms and Definitions, MH4.1-1958 (Revision of B75.1-1956)
Sponsor: Conveyor Equipment Manufacturers Association

MATERIALS AND TESTING

American Standards Approved

Zinc-Coated (Galvanized) Iron or Steel Farm-Field and Railroad Right-of-Way Fencing, Specification for, ASTM A 116-57; ASA G8.9-1958 (Revision of ASTM A 116-48; ASA G8.9-1948)

Zinc-Coated (Galvanized) Iron or Steel Barbed Wire, Specification for, ASTM A 121-57; ASA G8.10-1958 (Revision of ASTM A 121-48; ASA G8.10-1948)
Sponsor: American Society for Testing Materials

Thermometers, Specifications for, ASTM E 1-57; ASA Z71.1-1958 (Revision of ASTM E 1-56; ASA Z71.1-1956)
Sponsor: American Society for Testing Materials

MECHANICAL

American Standard Published

Carbide Blanks and Cutting Tools, B5.36-1957 (Partial revision of B5.22-1950) $2.00
Covers the designation, shapes and dimensional specifications of eight styles of sintered carbide blanks; tipped tools with square or rectangular shanks; boring tools, tipped and solid, round and square, and unshaped tool bits; and inserts 1½ inches long and their holders.
Sponsors: American Society of Tool Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers; American Society of Mechanical Engineers

American Standards Approved

Microscope Objective Thread, B1.11-1958
Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Carbon-Silicon Steel Plates of Intermediate Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels, Specifications for, ASTM A 201-57T; ASA G31.1-1958 (Revision of ASTM A 201-54T; ASA G31.1-1956)
Sponsor: American Society for Testing Materials

Molybdenum-Steel Plates for Boilers and Other Pressure Vessels, Specifications for, ASTM A 204-57; ASA G34.1-1958 (Revision of ASTM A 204-56; ASA G34.1-1956)
Sponsor: American Society for Testing Materials

High Tensile Strength Carbon-Silicon Steel Plates for Boilers and Other Pressure Vessels, Specifications for, ASTM A 212-57T; ASA G35.1-1958 (Revision of ASTM A 212-54T; ASA G35.1-1956)
Sponsor: American Society for Testing Materials

Mild- to Medium-Strength Carbon-Steel Castings for General Application, Specifications for, ASTM A 27-57; ASA G50.1-1958 (Revision of ASTM A 27-55; ASA G50.1-1956)
Sponsor: American Society for Testing Materials

In Standards Board

Markings for Grinding Wheels and Other Bonded Abrasives, B5.17- [Revision of B5.17-1949 (R1953)]
Sponsors: American Society of Mechanical Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers; American Society of Tool Engineers

Plow Bolts, B18.9- (Revision of B18.9-1950)
Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Mechanical Refrigeration Installations on Shipboard, Recommended Practice for, B59.1- (Revision of B59.1-1950)
Sponsor: American Society of Refrigerating Engineers

MINING

Reaffirmation Being Considered

Construction and Maintenance of Ladders and Stairs for Mines, M12.1-1946
Sponsor: American Mining Congress

Withdrawal Being Considered

Frogs, Switches and Turnouts for Coal Mine Tracks (Light-Rail Turnouts), M7.1-1933

Frogs, Switches and Turnouts for Coal Mine Tracks for 70-lb and 80-lb Rail, M7.2-1935
Sponsor: American Mining Congress

MISCELLANEOUS

In Standards Board

Guide for Quality Control, Z1.1-

Control Chart Method of Analyzing Data, Z1.2-

Control Chart Method of Controlling Quality During Production, Z1.3-
Sponsor: American Society for Quality Control

PAINTS AND VARNISHES

American Standards Approved

Tinting Strength of White Pigments, Method of Test for, ASTM D 332-57T; ASA K56.1-1958 (Revision of ASTM D 332-55T; ASA K56.1-1956)
Sponsor: American Society for Testing Materials

Dry Mercuric Oxide, Chemical Analysis of, ASTM D 284-57T; ASA K59.1-1958 (Revision of ASTM D 284-33; ASA K59-1941)
Sponsor: American Society for Testing Materials

PHOTOGRAPHY

American Standards Published

Medical X-ray Film Cassettes (Inch and Centimeter Sizes), Dimensions for, PH3.21-1957 (Revision of PH3.21-1955) $0.25
Sponsor: Photographic Standards Board

Photographic Sound Record on 35mm Prints, PH22.40-1957 (Revision of Z22.40-1950) $0.25

Projector Aperture for 35mm, Anamorphic, 2.35:1 Prints with Squeeze Ratio of 2:1, PH22.106-1957 $0.25

Sponsor: Society of Motion Picture and Television Engineers

American Standards Approved

Focal Length Marking of Lenses, PH3.13-1958 (Revision of Z38.4.4-1942)

Distribution of Illuminance Over the Field of a Photographic Objective or Projection Lens, PH3.22-1958

Sponsor: Photographic Standards Board

Photographic Thermometers, PH4.7-1958 (Revision of PH4.7-1956)

Photographic Laboratory Spring-Driven Timers, Specifications for, PH4.25-1958

Photographic Grade Acetic Acid, Glacial, Specifications for, PH4.100-1958 (Revision of Z38.8.100-1949)

Photographic Grade Acetic Acid, 28-Percent Solution, Specifications for, PH4.-106-1958 (Revision of Z38.8.106-1949)

Photographic Grade Sodium Acetate, Anhydrous, Specifications for, PH4.176-1958 (Revision of Z38.8.176-1949)

Photographic Grade Copper Sulfate, Specifications for, PH4.180-1958 (Revision of Z38.8.180-1949)

Photographic Grade Potassium Dichromate, Specifications for, PH4.300-1958 (Revision of Z38.8.177-1949)

Photographic Grade Potassium Permanganate, Specifications for, PH4.301-1958 (Revision of Z38.8.178-1949)

Photographic Grade Potassium Ferricyanide, Specifications for, PH4.302-1958 (Revision of Z38.8.179-1949)

Sponsor: Photographic Standards Board

American Standard Withdrawn

Maximum Safe Temperatures for Photographic Processing Solutions, Method for Determining, Z38.8.19-1948

Sponsor: Photographic Standards Board

PIPE AND FITTINGS

American Standards Approved

Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service, Specifications for, ASTM A 105-57T; ASA G17.3-1958 (Revision of ASTM A 105-46; ASA G17.3-1947)

Sponsor: American Society for Testing Materials

Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service, Specifications for, ASTM A 182-57T; ASA G37.1-1958 (Revision of ASTM A 182-56T; ASA G37.1-1957)

Sponsor: American Society for Testing Materials

Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for General Service, Specifications for, ASTM A 181-57T; ASA G46.1-1958 (Revision of ASTM A 181-55T; ASA G46.1-1956)

Sponsor: American Society for Testing Materials

Seamless Copper Pipe, Standard Sizes, Specifications for, ASTM B 42-57; ASA H26.1-1958 (Revision of ASTM B 42-55; ASA H26.1-1956)

Sponsor: American Society for Testing Materials

Seamless Red Brass Pipe, Standard Sizes, Specifications for, ASTM B 43-57; ASA H27.1-1958 (Revision of ASTM B 43-55; ASA H27.1-1956)

Sponsor: American Society for Testing Materials

In Standards Board

Brass Fitting for Flared Copper Tubes, B16.26- (Revision of A40.2-1936)

Sponsor: American Society of Mechanical Engineers; Mechanical Contractors Association of America; Manufacturers Standardization Society of the Valve and Fittings Industry

Welded Wrought-Iron Pipe, Specifications for, ASTM A 72-56T; ASA B36.2- (Revision of ASTM A 72-55; ASA B36.2-1956)

Electric-Fusion Welded Steel Pipe for High Temperature Service, Specifications for, ASTM A 155-56T; ASA B36.11- (Revision of ASTM A 155-55; ASA B36.11-1956)

Seamless Steel Boiler Tubes, Specifications for, ASTM A 83-56T; ASA B36.12- (Revision of ASTM A 83-55T; ASA B36.12-1956)

Electric-Resistance-Welded Steel and Open-Hearth Iron Boiler Tubes, ASTM A 178-56T; ASA B36.13- (Revision of ASTM A 178-55T; ASA B36.13-1956)

Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Use, ASTM A 120-54; ASA B36.20- (Revision of ASTM A 120-47; ASA B36.20-1951)

Seamless Cold-Drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes, ASTM A 179-56T; ASA B36.28- (Revision of ASTM A 179-55; ASA B36.-28-1956)

Seamless Cold-Drawn Intermediate Alloy-Steel Heat-Exchanger and Condenser Tubes, ASTM A 199-56T; ASA B36.29- (Revision of ASTM A 199-55; ASA B36.29-1956)

Electric-Resistance-Welded Steel Heat-Exchanger and Condenser Tubes, ASTM A 214-56T; ASA B36.32- (Revision of ASTM A 214-55T; ASA B36.-32-1956)

Sponsors: American Society of Mechanical Engineers; American Society for Testing Materials

RUBBER INDUSTRY

American Standard Approved

Sample Preparation for Physical Testing of Rubber Products, Methods of, ASTM D 15-57T; ASA J1.1-1958 (Revision of ASTM D 15-55T; ASA J1.1-1956)

Sponsor: American Society for Testing Materials

SAFETY

American Standards Approved

Electric and Gas Welding and Cutting Operations, Safety Standard for, Z49.1-1958 (Revision of Z49.1-1950)

Sponsor: American Welding Society

Safe Design and Use of Industrial Beta Ray Sources, Z54.2-1958

Sponsor: National Bureau of Standards

WOOD AND WOOD PRESERVATIVES

Reaffirmation Requested

Static Tests of Timbers in Structural Sizes, ASTM D 198-27; ASA O4b-1927

Sponsor: American Society for Testing Materials

Europe's Standards Men Study Effect of "Common Market"

• The implications for industrial standards of the proposed establishment of a European Common Market and a Free Trade Area were discussed at a meeting in Paris last October, *BSI News* reports. The *News* is a publication of the British Standards Institution.

Principal representatives were heads of national standards organizations of countries likely to participate in a Free Trade plan—Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden, Turkey, and the United Kingdom.

The delegates agreed that coordination of European standards should be in line with agreements in the International Organization for Standardization (ISO) and with the recommendations being developed by technical committees of the ISO. They felt that where the work needs to be accelerated, the ISO member bodies among the countries of the Free Trade Area should meet together to unify their views and present them to the wider ISO group.

Future meetings will provide a forum where the participating countries can seek a common approach in their attitude toward international standards agreements. "It is probable, for example," the *BSI News* reported, "that a list of priorities will be prepared of those materials and products where unification of the major standards of European countries is likely to become more urgent because of free trade considerations."

BSI committees responsible for formulating policy on ISO activities will study the whole of the implication on standards of possible UK participation in a Free Trade Area.

news briefs . . . . .

• British, Canadian, and USA representatives met October 15-17 in a working group to discuss ABC problems on screw threads. USA delegates were members of Subcommittees 9 on Gaging and 11 on International Cooperation of the Sectional Committee on Screw Threads, B1. They discussed screw thread sizes above 1 inch; diameter-pitch combinations; numbered sizes; symbols; gages and gaging. Some of the results of the meeting will be submitted to ISO Technical Committee 1 as an ISO proposal for screw threads in the inch system. Complete reports were made to the screw thread committees of the three countries. Heads of the delegations, shown here at head table, are W. H. Gourlie, Sheffield Corporation, USA (left); John H. McKay, Canadian Standards Association (center); Stanley Harley, Coventry Gauge and Tool Company, UK (right).

• Dr Jules Labarthe, an important figure in work of ASA committees on standards for textiles, has been appointed Professor of Textile Technology of the Carnegie Institute of Technology.

Dr Labarthe is chairman of ASA Sectional Committee L14 on Textile Test Methods and has been active in work on textile performance standards developed by the L22 and L24 sectional committees. He has been a member of the ASA Consumer Standards Board since 1947, when the Board was known as the Advisory Committee on Ultimate Consumer Goods.

The National Retail Merchants Association (formerly the National Retail Dry Goods Association), which Dr Labarthe represents on ASA standards committees, honored him early this year for "outstanding contributions in fostering improved performance standards in textiles in the interests of the consumer." Dr Labarthe received a silver plaque from the Association. He is also chairman of the NRMA Consumer Relations Committee and Technical Committee, and is a member of the American Society for Testing Materials' Advisory Committee on Ultimate Consumer Goods.

The Carnegie Institute of Technology announces that Professor Labarthe will play a major role in developing a new program of textile technology in the Department of Home Economics of Margaret Morrison Carnegie College. For the past 27 years he has been Senior Fellow on the Commodity Standards Fellowship maintained at Mellon Institute by the Kaufmann Department Stores of Pittsburgh. The Fellowship staff evaluates and establishes specifications for merchandise, and provides scientific investigation in customer complaint cases.

• The word "simultaneously" has been added to the official definition of "air conditioning" adopted by the American Society of Heating and Air-Conditioning Engineers.

The new definition recommended by the Society is as follows:

"Air Conditioning is the process of treating air so as to control simultaneously its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space."

The Council of the Society has approved this new definition sponsored by its Standards Committee.

• American Standard Requirements for Installation of Gas Conversion Burners, Z21.38-1957, tell how to switch to gas effectively and safely. The standard gives fundamental rules for installing gas conversion burners on home ranges which formerly used liquid or solid fuels, including kerosene, oil, coal, or wood.

The original American Standard on the subject was published in 1951. The latest edition represents seven years of testing and trial of the first standard and the newest developments by the gas industry.

The American Gas Association is sponsor.

Copies are available from ASA at 25 cents each.

• Prologue to the Next Decade is the theme of the 1958 President's Conference on Occupational Safety to be held in Washington, D. C., March 25-27. This year's conference, being tenth in the series, will review safety developments during the past ten years and indicate expected developments for the next ten.

Cyril Ainsworth, Deputy Managing Director of the American Standards Association, will participate in the opening session devoted to the Prologue theme. Others active in this session will be David Arm, National Safety Council; Alfred C. Blackman, California Department of Industrial Relations; Dr Leon Brody, New York University; R. H. Ferguson, Republic Steel Corporation; and Charles A. Pearce, New York Department of Labor.

Workshops will be principal features of the meeting. These will include discussions on Off-the-Job Safety; Safety Through Organizations; What Makes Us Work Safely; Radiation; Figures at Work; The Schools' Contribution to Safety, and State Safety.

Vice Admiral W. A. Kitts, 3rd, USN (Ret), member of the ASA Nuclear Standards Board, will be moderator of the workshop on Radiation; and Henry G. Lamb, ASA Safety Engineer, will take part in the workshop on Figures at Work.

• Phillips Industries, Limited, recently installed a 1,000,000-volt capacity impulse generator in the Toronto plant of Moloney Electric Company, Canada Limited. The purpose of the equipment is to test public utility transformers with simulated lightning shocks. The generator builds up standard Hydro 220 volt current to create the big charge which can jump a five-foot wide gap. All tests are carried out under specifications set up by the Ameri-

can Standards Association, according to *Manufacturing & Industrial Engineering,* June 1957.

• Eight standard samples of purified celluloses, representing substantially the entire range of commercial cellulose materials, are now available, the American Society for Testing Materials announced recently. These samples are intended for use by laboratories throughout the world that are interested in the standardization of cellulose analysis methods. The project was a result of the cooperative efforts of Committee D-23, the American Chemical Society Committee on Standards and Methods for Cellulose, and the Chemical Methods Committee of the Technical Association of the Pulp and Paper Industry (TAPPI).

The eight samples were prepared and stored with the cooperation of the respective suppliers by Karen Wilson, chairman, International Committee on Cellulose Analyses, and E. E. Hembree, chairman, Subcommittees on Alkali Solubility Tests of both ASTM Committee D-23 and ICCA. Standard samples are available for: (1) Cotton Linters, acetate grade (Buckeye Type 1AR500); (2) Acetate Grade Sulfite Pulp (Rayonier's Rayaceta); (3) Prehydrolyzed Sulfate Tire Cord Pulp (Buckeye Type V-5); (4) Rayon Grade Sulfite (Riordan's Novocell); (5) Cellophane Grade Sulfite (Rayonier's Rayamo); (6) Rayon Grade Sulfite Pulp (birch Swedish pulp); (7) Paper Pulp, regular grade (Swedish pulp); and (8) Paper Pulp, grease proof grade (Swedish pulp).

These standard samples will permit the study of new methods and new approaches to old methods using identical samples of cellulose, ASTM explains.

Inquiries concerning the standard samples should be addressed to E. E. Hembree, Buckeye Cellulose Corp., 2899 Jackson Ave., Memphis 1, Tenn. European inquiries should be addressed to Karen Wilson, Chairman, International Committee on Cellulose Analyses, Uddeholm, Aktiebolag, Skoghallsverken, Skoghall, Sweden.

Standards Outlook

by LEO B. MOORE

Mr Moore is Associate Professor of Industrial Management, Massachusetts Institute of Technology, where he teaches a full-term course in industrial standardization.

Reilly's Three Points

Standardization is a relatively simple concept compared to many found in business and industry today. Mathematics is an example of an area having an increasing impact on management with increasing complexity. From the simple notions of production and quality control we have seen this growth in the form of budgeting, forecasting, operations research, linear programming, waiting-line theory—all with successful application and broader scope. The end is not in sight of the many ways in which we will use all our sciences to aid management in its problems of the future. Why, then, do we find difficulties in the application of the simple notion of standardization?

William J. Reilly in his book, *The Law of Intelligent Action,* presents some interesting ideas that may shed light on this concern. Reilly says, "When a person is confronted with a problem, the intelligence of his action is dependent upon three primary factors: 1. His desire to solve the problem, 2. His ability to solve it, and 3. His capacity for handling the human relations involved."

Reilly seems to have here a message for every practicing standards engineer whether he is working in his company program or in one of the many group endeavors of associations, societies, and governmental units. For most of us, group action seems to heighten our desire to solve the problem, our ability to solve it, and our effective human relations, by calling upon an underlying sense of worthwhileness and a deeper stream of motivation as we work with others. The sameness of company activity tends to dull our senses and requires a stronger pattern of motivation to achieve the same ends—motivation, for example, such as our own advancement, dedication, or faith. Most standards engineers, I am sure, will find food for thought in Reilly's words as they consider their own effectiveness.

Each individual standards engineer should be able to evaluate his desire, ability, and human relations practices and their impact upon his company program. Such a task, however, is better left to the individual in the quiet of his own thoughts and, where appropriate, in consultation with people in whom he finds and shares mutual confidence.

Rather than spelling out in detail the ideas included in these three areas, I prefer to consider the larger notion of how the standards engineer can measure the company as a whole with regard to its standards endeavors.

Here are a few questions, the answers to which may help. What is a true measure of the company's desire for standardization? Where does this desire lie, particularly and generally? In what areas should a more positive attitude exist? Could a standards engineer determine his real problems through an evaluation of his company's standards program? How able is the company organization in the knowledge and skills of standardization? Where should this knowledge and these skills reside and to what degree? How effective has the standards group been in selling, training, and education? What is the human relations climate? Does the standards group have a positive human relations attitude built into its program?

Questions in this order and their answers might help the standards engineer to turn Reilly's three points to advantage and make his own work on standards, as well as that of his company, more effective.

WHAT'S NEW ON AMERICAN STANDARDS PROJECTS

Code for Pressure Piping, B31–

Sponsor: American Society of Mechanical Engineers. Interpretations Submitted by the Sponsor

From time to time certain actions of Sectional Committee B31 are published for the information of those interested. While these do not constitute formal revision of the Code, they may be utilized in specifications, or otherwise, as representing the considered opinion of the committee.

Case No. 31 is published herewith as interim action of Sectional Committee B31 on the Code for Pressure Piping but will not constitute a part of the Code until formal action has been taken by the American Society of Mechanical Engineers as sponsor and by the American Standards Association on approval of a revised edition.

Case No. 31

Inquiry: May steel pipe produced under ASTM Specification A 381-54T be used in construction that must comply with American Standard B31.1.8-1955, Gas Transmission and Distribution Piping Systems (Section 8 of the Code for Pressure Piping)? If so, what joint factor may be used?

Reply: It is the opinion of the committee that pipe meeting the requirements of ASTM Specification A 381-54T meets the intent of the Code and may be used under American Standard B31.1.8-1955 and with a longitudinal joint factor *E* equal to 1.

Electric Lamp Bases and Holders, C81–

Sponsor: Electrical Standards Board

At a recent meeting of a study group of the C81 committee, it was decided to revitalize the committee by setting up new subcommittees on (1) lamp bases before application to a lamp; (2) bases as a part of lamps; and (3) lamp holders. The chairman noted that "the ever expanding production and application of bases for lamps continues to generate technical problems. . . ."

Shipping Containers–

A project for development of standard size shipping containers was recommended to the American Standards Association at a general conference in December, 1957.

Representatives of the packaging, materials handling, and transportation fields concurred in the need for standard dimensions of such transportation equipment as pallet containers, cargo containers, and van containers for efficient handling and shipping of goods and proper use of space on all common carriers. Standard-size containers will make possible the maximum coordination of freight space, whether the container is carried by truck, train, plane, or ship.

It was recommended that the American Materials Handling Society and the American Society of Mechanical Engineers serve as sponsors of the project.

Safety for Use of Cleaning Solvents–

The ASA has been asked to initiate a project on the safe use of cleaning solvents in the graphic arts industry. A general conference which met early in December recommended that such a project be undertaken. The suggested scope would include storage and handling. The Research and Engineering Council of the Graphic Arts Industry is being invited to sponsor the work.

Printing plants use gasoline or benzene for cleaning plates and rollers of wet ink, a hazardous practice and cause of a high insurance rate, it was explained.

Primary need, the conference agreed, is for a performance code incorporating all the various requirements for safe use of cleaning solvents in one document. One of the basic problems is to educate printers to use a safe solvent. It was suggested that an American Standard recommending such use would aid in the educational activity.

Drawing and Drafting Practice, Y14–

Sponsor: The American Society of Mechanical Engineers

The work on drawing and drafting standards is so great that Sectional Committee Y14 has assigned important segments of the problem to subcommittees. One of these is Subcommittee 15, Electrical Diagrams. The subcommittee now has nearly completed a proposed standard on schematic diagrams prepared by its task group on electronics and communications. Comments have been received from both industry and the Armed Services. A meeting of the Y14.15 Steering Committee is scheduled for late in February, 1958, to consider problems indicated by these comments.

The work of Y14.15 is being done by three task groups under the supervision of the subcommittee's chairman and its steering committee on policy and coordination.

Task Group 1, Electrical Diagrams for Electronics and Communications, worked closely with Task Group 2 in developing the proposed standard on schematic diagrams. It is now completing a draft on Connection Diagrams, which will also be coordinated with the work of Task Group 2.

Task Group 2, on Power Switchgear and Industrial Control, expects to report a final draft for all types of diagrams during 1958.

Task Group 3 will deal with Logic Diagrams for Digital Computers, but has not as yet become a working group. The chairman of this Task Group represents Y14.15 on the Institute of Radio Engineers' Technical Committee 8.9 for Digital Computer Symbols. When IRE's plans for a symbols standard take definite shape, Task Group 3 will take the necessary steps to standardize logic diagram practices.

D. C. Bowen, Standardizing Division, RCA Victor Division, Camden, N. J., chairman of Subcommit-

tee Y14.15 reports that the total active membership of the subcommittee has remained at a level of from 25 to 30 individuals for nearly three years. "One of the features that has characterized all steering committee or Task Group operations is the consistently high percentage of members who attend regularly scheduled meetings — in many instances 100 percent," he says. Approximately 20 to 25 of these meetings have been held annually for the past two years.

Passenger Conveyors—

A general conference of those concerned is being held March 4 to decide whether an American Standard safety code is needed for passenger conveyors. These are the so-called moving sidewalks developed several years ago and now being sold for mass movement of the public. They have been considered to come under the scope of the Sectional Committee on Conveyors and Related Equipment, B20. However, members of the Sectional Committee on the Safety Code for Elevators, A17, have protested the inclusion of moving sidewalks within the scope of the B20 code.

The March 4 conference will be asked to make recommendations as to whether or not work should be initiated on a safety standard for passenger conveyors and, if so, whether this should be assigned to some present project of ASA, or whether a new project should be initiated.

Diamond Abrasives, B74—

Sponsors: The American Society of Mechanical Engineers; Society of the Plastics Industry; American Society for Testing Materials

The title of this project, originally known as "Diamond Abrasive Wheels" has been changed, and the scope of the project defined as:

"The development of identification and dimensional standards for bonded diamond abrasives but not including industrial diamonds as such or diamond dressing tools of the single and multiple point variety."

In making this change, it was also decided to include the American Society for Testing Materials, with ASME and SPI, as a third sponsor.

Mr Ainsworth has served for many years as Technical Director of the American Standards Association. He is now Deputy Managing Director and Assistant Secretary.

DINNSA

by **Cyril Ainsworth**

In the United States, standardization started within a company whenever the company found a need for design standards and purchase specifications. Gradually, a need for industry-wide standards arose. Imagine the chaos in the electrical industry and the effect on the general economy, if there were no standard voltages and frequencies. Because of needs such as this, technical societies and trade associations increasingly included standardization in their programs.

About 1912, questions began to arise as to the need for standardization on the national level. It was not until World War I that serious discussions took place. In October 1918, the American Engineering Standards Committee (now the American Standards Association) was created to coordinate the work of trade associations, technical societies, government agencies, and other groups engaged in standardization work. Thereby, this national organization was to eliminate duplication of effort and avoid the promulgation of conflicting requirements. ASA continues to perform this function.

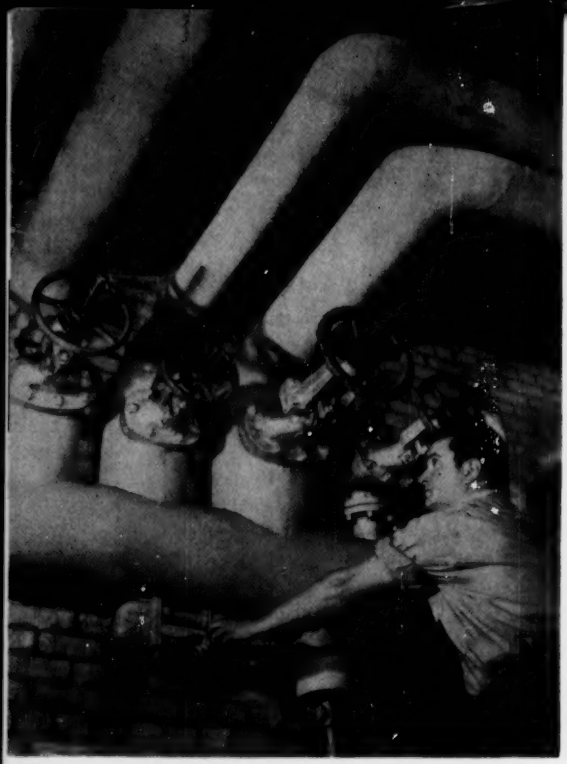
Why cannot each industry do all its standardization work through its own trade association or technical society, instead of using the service provided by the procedures of the American Standards Association?

The answer is clear. In a surprisingly small number of cases is a standardization problem of primary concern to only one organized producer or consumer group. In fact, most such problems affect many varied groups and interests. The standardization of wood poles for power and communication lines is an example. This project brought together not only the producers of the different species of wood poles but also, on the consumer side, the power, telephone, telegraph, municipal, steam and electric railway groups. In addition, colleges of forestry, technical societies such as the American Society for Testing Materials and the Society of American Foresters, wood preserver organizations, and departments of the Federal Government, participated. All these groups cooperated in the building of standards that have been revised several times. They cooperated through representation on a technical committee sponsored by the Telephone Group. Working separately would have meant chaos.

In a recent publication, the National Industrial Conference Board states: "Company standards programs depend heavily on standards formulated by industry, Government, and technology. Few firms would wish to formulate all their own standards even if they could. The national structure of inter-firm and inter-industry relationships is so complex and so pervasively interdependent that consistency of its standards with accepted standards of its supplying and consuming industries is a practical necessity."

How can a company make its standards consistent with the accepted standards of its supplying or consuming industries? Only through a "brand name" approach to available standards or the service of some agency that will certify which standards have an acceptance that will justify their use.

ASA's service of approving as American Standard standards developed by many industrial, consuming, technological, and governmental organizations saves a company the time, effort, and expense of searching for the standard with the widest acceptance and highest technical quality obtainable on a national basis.



Shell Chemical Corp.

High-temperature steam line at the Chemical Construction Corporation's Linden, N.J. plant.

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